AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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Number Eleven
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SEPTEMBER, 1923

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W. R. C. Smith Publishing Co.
Dalton, and Atlanta, Ga.

STRONGER pull than best oak tanned belting is the simple fact about Stronghold Belting. It is built from Rhoads Tannate side leather and has the wonderful Tannate grip.

It is very tough, and pliable and particularly adapted to use over small pulleys at high speed.

And, like Tannate, it resists machine oils, acid fumes and high temperatures.

On spinning and knitting machinery and other drives not over six inches wide it has given unusual satisfaction because its strong grip means power saved, and output increased.

Give all leather belts to keep them in best condition occasional applications of Rhoads Belt Preserver.

J. E. RHOADS & SONS
PHILADELPHIA 12 N. THIRD ST.
NEW YORK 102 BEEKMAN ST.
CHICAGO 322 W. RANDOLPH ST.
FACTORY AND TANNERY, WILMINGTON, DEL.

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This Mill President Makes "Phantom Sales"

EVERY now and then he lets his business imagination put a woman buyer, a housewife, in his visitor's chair. Then he tries to sell her his goods. He honestly tries to imagine her answers, and he hands out the criticisms pretty straight.

He learns a whole lot about the strength and weaknesses of his product. He keeps himself alive to the fact that eventually his fabric must be sold in the retail stores, and that it must have real selling features that will help the retail salespeople distribute his goods to that great customer of manufacturer, wholesaler and retailer. Mrs. James J. Public.

One of the things his imaginary visitors made clear to him years ago is the superiority of Franklin Process Dyeing. He knows that Mrs. Public buys colored goods 75% on the basis of color alone—fashionable, clean, even, beautiful, fast color. He has investigated and found that there is no better way to get such color than through Franklin Package Dyeing, whether his fabric be cotton, wool, worsted or silk.

And he has found that Franklin Package Dyeing is, with the great majority of colors, the least expensive process in spite of its high quality.

FRANKLIN PROCESS CO.

Philadelphia PROVIDENCE Manchester, Eng.

New York Office, 72 Leonard Street

SOUTHERN FRANKLIN PROCESS CO

Greenville, S. C.

Can You Afford To Polish Drop Wires With Your Warps

Every Drop Wire in the Warp Stop Motions on your Northrop Looms chafes three warp threads. Drop Wires are made of ribbon steel fashioned on a punching machine. If not properly finished after the punching—and both time and skill are required to put them in fit condition for use—the rough edges of the wire will saw, scratch and tear your warps with disastrous effects in lost loom production and poor cloth.

Cheap Drop Wires Are Made To Sell on Price Alone

They are designed to appeal to buyers through comparison of price. They are not designed for service and production. Savings in first cost at the expense of quality are always an unprofitable experiment in fittings and supplies for automatic looms. Maximum loom production, even when the Drop Wires are new, is assured by the use of

Draper Mirror Drop Wires

which are made by skilled workmen and proved methods of manufacture that are guaranteed to produce a wire that will not saw, scratch and tear your warp yarn.

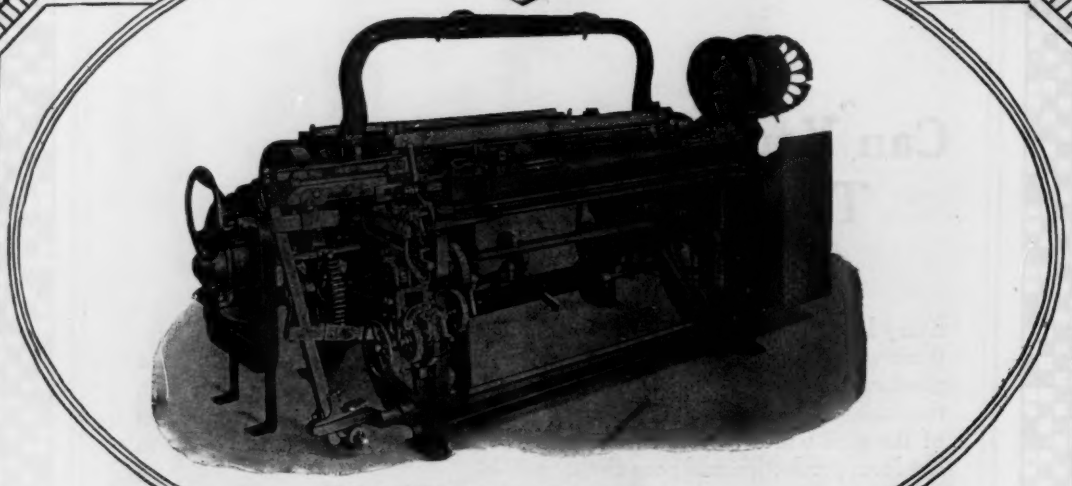
Let's Talk It Over. Our Salesmen and Experts will be glad to explain. Visit our plant and see these Drop Wires made. We will send at your request a short printed story of Mirror Drop Wires and why they are superior.

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

SOUTHERN OFFICE ATLANTA GEORGIA

Copyright 1917 by Draper Corporation



Stafford bobbin-changing plain goods loom.

Stafford Looms Increase Production

We manufacture a complete line of automatic looms, both shuttle and bobbin-changing for weaving practically every type of fabric that can be made with a single shuttle. ¶Stafford shuttle-changing looms will handle cop filling just as successfully as bobbin filling. We have a loom for every kind of yarn, coarse or fine, and for practically every variety of fabric, plain or fancy.

THE STAFFORD COMPANY
WEAVING MACHINERY
READVILLE, MASS.

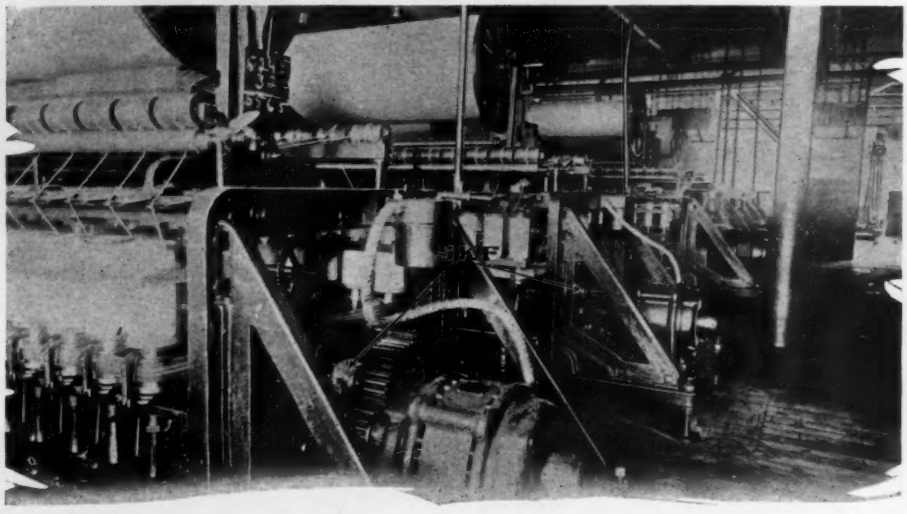
Branch Office
502 Colt Building
Paterson, N. J.

Southern Agent
Fred H. White,
Charlotte, N. C.

Canadian Representative
Whitehead, Emmans, Limited
Montreal

AUTOMATIC
STAFFORD
LOOMS

SKF



Ball Bearings on Twister Drums

Prevent Vibration and Increase Production

WHEN cylinder drums on cotton twisters are mounted on plain bearings, noise, looseness and play soon occur due to wear in the bearings. As a result considerable vibration occurs and the tapes slip, the bobbins jump and, in some instances, the shaft crystalizes and breaks. Furthermore where machines are motor driven with chain connection, a great deal of trouble is often experienced in keeping the chain on, because the motor pinion and the drive gear will not stay in correct alignment.

SKF marked self-aligning ball bearings on the drum shaft prevent vibration as wear in this type of bearing is so small as to be negligible. In addition the tapes driven by the drum require fewer adjustments and the bobbins are more uniformly wound. Production too can be increased for ball-bearing twisters can produce about 12-½% more twisted yarn—and yarn which is of better quality.

May our engineers submit recommendations for a changeover?

THE SKAYEF BALL BEARING COMPANY

Supervised by SKF INDUSTRIES, INC., 165 Broadway, New York City

1006

Normal View *Deflected View*

BALL BEARINGS

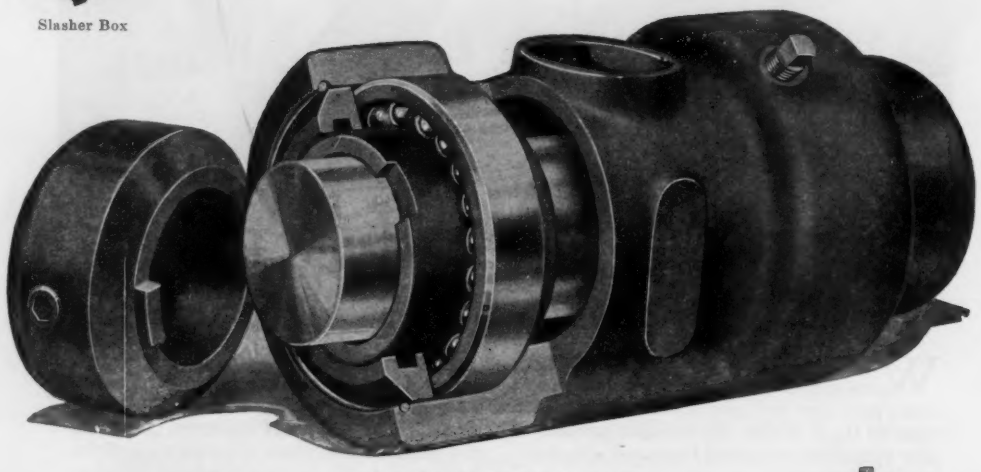
The Highest Expression of the Bearing Principle

FAFNIR

Slasher Box

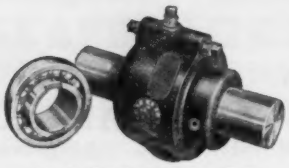
Blower and Fan Box

Double Bearing Pillow Block

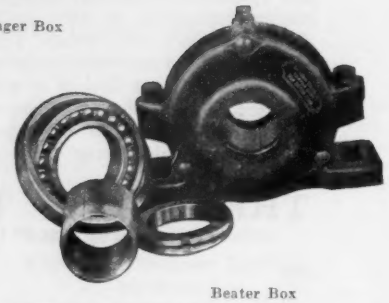


Fafnir Double Ball Bearing Hanger Box

Fan Box



Single Bearing Hanger Box



Beater Box

Fafnir Ball Bearing Boxes are manufactured complete for your machines and power transmission units. They are easily installed, save a vast amount of power, virtually eliminate maintenance, and do away with dripping oil. Write for Industrial Bearings Catalogue.

All standard types and sizes.

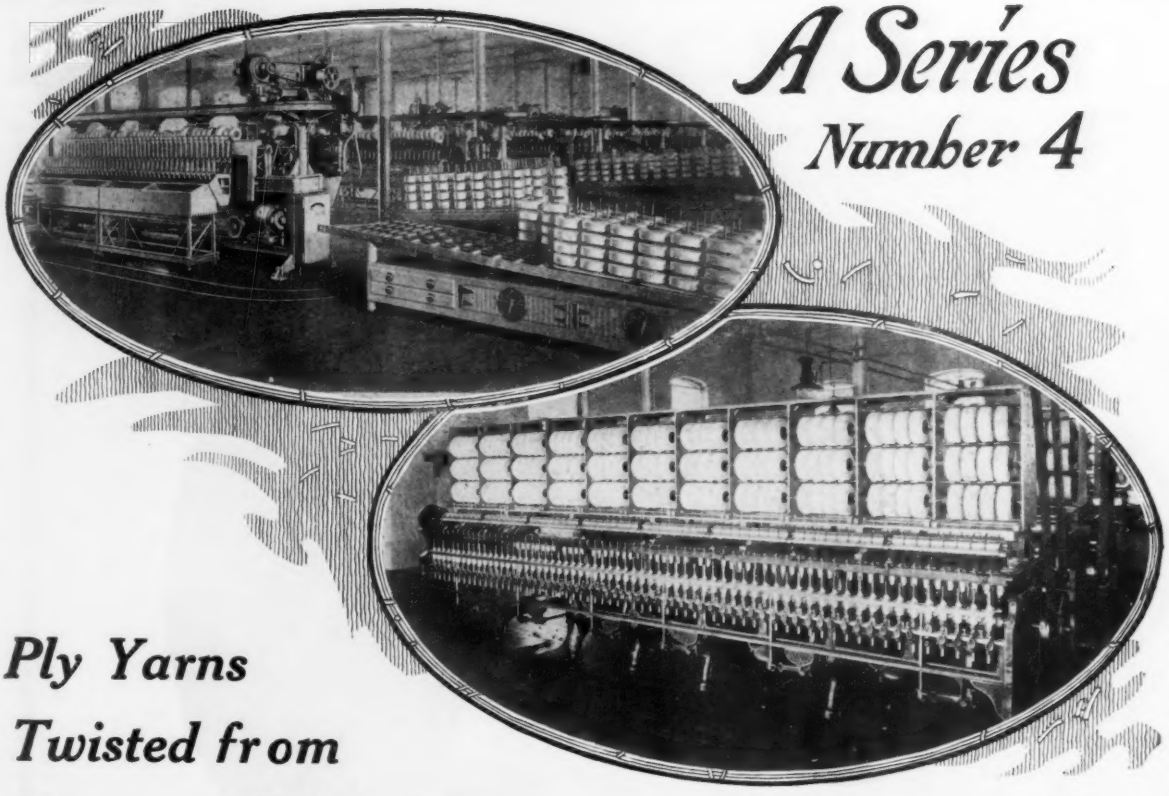
THE FAFNIR BEARING COMPANY

New Britain, Conn.

Southern Representatives

O. R. S. Pool,
Box 1375,
Greenville, S. C.

S. M. Smith,
P. O. Box 1423,
Greensboro, N. C.



A Series Number 4

Ply Yarns Twisted from Cheeses With Every Knot a Weavers Knot

The Barber-Colman process as adapted to twisting produces better yarn at less cost. The yarn is wound on our Automatic Spooler under low and uniform tension with no spooler kinks and fewer knots.

Our Twisting Creels as illustrated above are furnished in various sizes and may be adapted to most standard types of Twisting Frames.

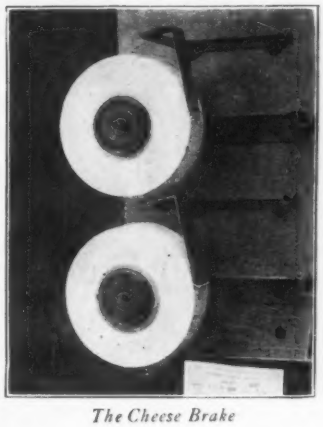
The method of regulating tension and preventing backwinding on the Twister Creels is illustrated in the picture at right.

FULL DATA SENT ON REQUEST.

BARBER-COLMAN COMPANY

ROCKFORD, ILL.

BOSTON, MASS. GREENVILLE, S. C.



The Cheese Brake

BARBER-COLMAN SYSTEM OF SPOOLING AND WARPING

AUTOMATIC SPOOLER *with* WEAVERS KNOTTER

HIGH SPEED WARPER

The First Hard Rubber Spool

Interchangeable WITH WOODEN SPOOLS

The superior qualities of hard rubber makes it the most ideal material possible for perfect textile spools.

It assures a spool that cannot be broken, splintered, bent or dented, even when given the roughest treatment.

It assures a spool with a perfectly smooth finish with no seams or projections to catch the yarn—a finish that will never wear rough.

It assures a spool whose heads will not loosen.

It assures a spool that will never warp, as moisture and climatic conditions have no effect upon it.

Test it yourself, and prove to your own satisfaction that it is the most perfect and economical spool possible.

Samples gladly sent to textile mills on request.

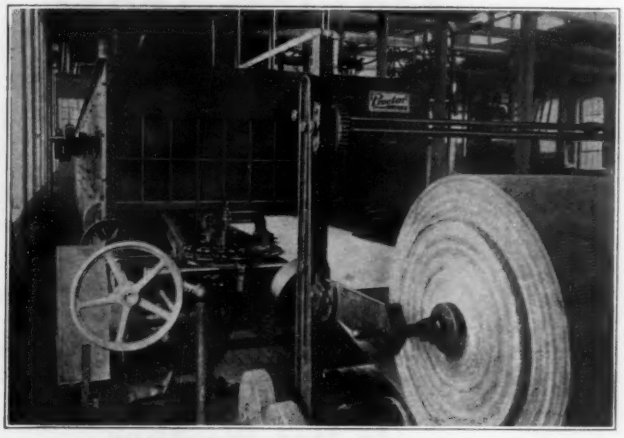
THE TEXTILE RUBBER CO.

225 OHIO BLDG.

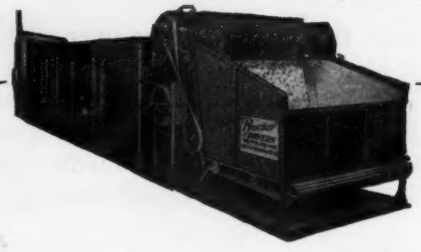
Akron, Ohio

DRYING MACHINERY

TYPES FOR ALL TEXTILE RAW MATERIALS AND PRODUCTS



"Proctor" Housing and Air Circulation System for Cotton Goods Tenter.



"Proctor" Single Conveyor Dryer for Cotton and other Raw Stock

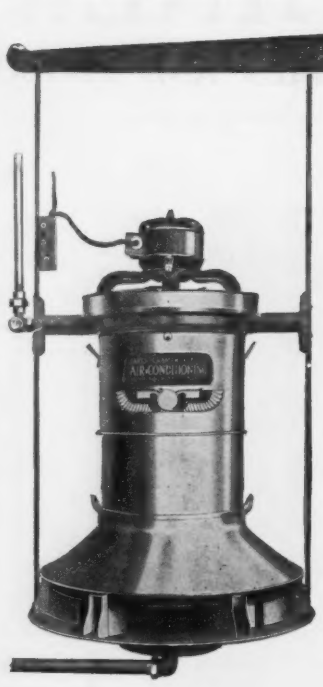
IN the many different types and applications of "Proctor" Dryers, you are sure to find the most satisfactory means of drying any textile raw stock, yarn or fabric—at new low limits of cost.

There are Single Conveyor and Three Conveyor types of "Proctor" Dryers for raw stock; Truck and Automatic Dryers for skein yarns; Tray Dryers for package yarns; Automatic Loop Dryers for piece goods; Housing and Air Circulation Systems for cotton and woolen goods tenters; Automatic Boarding Machines for hosiery; Carbonizing Dryers for wool stock, rags and cloth.

Often, very unusual drying requirements are mastered in modification of standard types of "Proctor" Dryers, or in new designs. In any problem of drying, you can make good use of our unequalled experience—an experience of 40 years, specializing in drying machinery.

PROCTOR & SCHWARTZ, INC.

Formerly
THE PHILADELPHIA TEXTILE MACHINERY CO.
SMITH & FURBUSH MACHINE COMPANY
PHILADELPHIA, PA.



ParkSpray Humidifier Installations

Permit Liberal Air Change —and Cool in Hot Weather

"It may be that you already think that we are over enthusiastic about your installation at our plant and it also may be that we are spoiling you by our continued praising of your humidity control, however, we cannot refrain from enclosing record of hygrometer readings, taken in our spinning room yesterday, especially after reading the morning paper and noting the number of plants which closed down on account of excessive heat.

"You will note the temperature did not exceed 89 degrees in this room, where we have 50,000 spindles and a flat gravel roof overhead. The writer has no doubt that the temperature in this room, would have reached at least 98 degrees if the conditions had prevailed as they were prior to the installation of your apparatus."

Yours very truly,
FITCHBURG YARN COMPANY,

June 22, 1923.
Fitchburg, Mass.

Robert H Wallace
Treasurer

Profit by "High Duty" Climate

Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte

Right Region

The "Super" recommends
WK10 and WK20 Safety Motor Starters

"If others can do it, we can"—this was the closing argument of the plant Superintendent in his plea for the installation of WK-10 and WK-20 Safety Motor Starters.

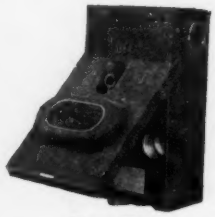
Protection—not only to the operator but also to expensive equipment.

WK-10 and WK-20—a Safety Motor Starter for every a-c. motor, from the smallest to 5 hp.

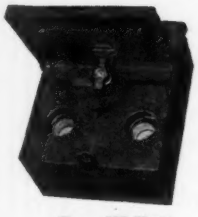
Write our nearest District Office for Leaflet 3435-A.

Westinghouse Electric & Manufacturing Company
Mansfield Works **Mansfield, Ohio**

"This ad. gave us the tip"



Type WK-10
For motors up to 2 hp.

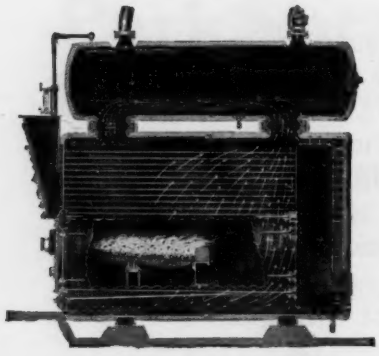


Type W-K 20
For motors up to 5 hp.

ELECTRICAL WORLD
W
WESTINGHOUSE ELECTRIC
—and liability insurance dropped $162."
A box manufacturer of Louisville, Ky., was speaking.
He said his company had installed Westinghouse-Krantz Type WK-20 Safety Motor Starter Switches at a cost of $180 and a later insurance survey resulted in a reduction of $162 a year in the company's liability insurance premiums.
$162 yearly return on an $180 investment! But it happens often.
Type WK-10, 20, 30 and 100, a Safety Motor Starter for every a-c motor, from the smallest to 15 hp. capacity.
Many other advantages, too.
Ask any Westinghouse dealer or write to the address below for Folder 4500.
Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pennsylvania
Westinghouse

Westinghouse

More Dry Steam With Less Fuel



HERE'S a perfect Scotch Boiler—a boiler that will generate more steam with less fuel.

Rapid, unrestricted circulation is absolutely necessary to the efficiency of any boiler, and while this feature is claimed for by many boiler manufacturers, the design of this boiler is such that it is positive at all times.

Large overload capacity, dry steam generated, and the remarkable flexibility of meeting fluctuating demands particularly adapts this boiler to severe conditions in industrial mills and plants.

Greatest economy is assured because of the circulating passage, which delivers water from the front neck to the bottom of the shell.

A constant temperature is assured because of this circulation which relieves uneven strains and stresses on this type of boilers.

There are no troublesome brick settings, as the boiler is self-contained and is ready for operation upon delivery.

Write today for detail information.

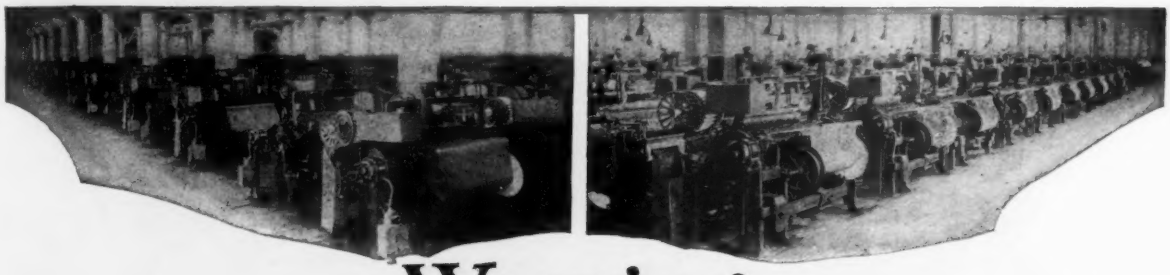
INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

Southern Representative, Isaac Hardeman, Charlotte, N. C.

BOSTON **NEW YORK**
PHILADELPHIA **SAN FRANCISCO**

Cotton

To Maintain Maximum Production Speed



Weaving

Use G-E Individual Motor Drive

There are many mills using G-E Loom Motors in numbers of 1000 and upward—and their method of drive is a motor geared to each loom.

This accepted form of individual drive secures a uniform speed which obtains greatest production from the loom, and the best quality of product.

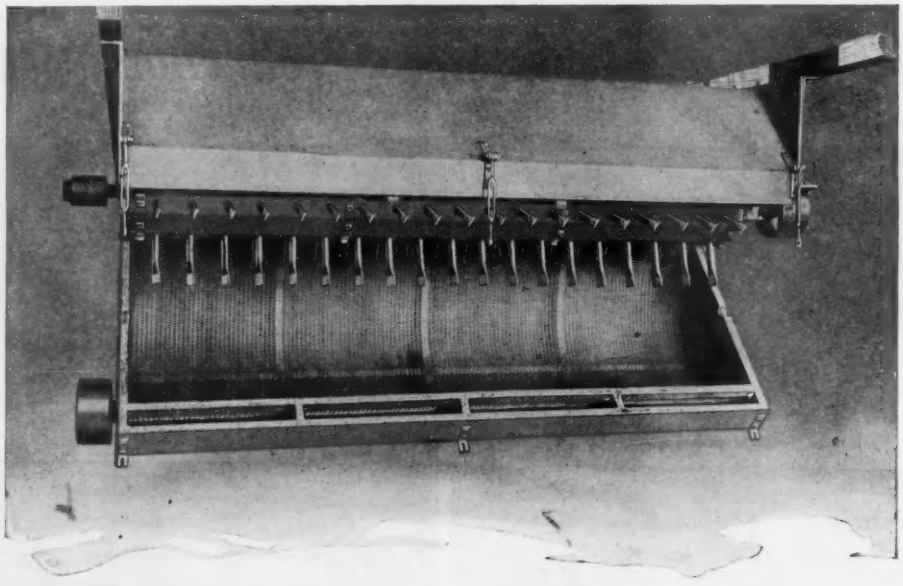
For this service, G-E Motors are totally enclosed; and have waste-packed, dust-tight bearings; tapered shafts, oil-tempered steel pinions. They are designed for low slip, low temperature rise, and high operating characteristics. A complete line of G-E Motors up to 2 HP, for various voltages and frequencies, are available—with G-E Controllers to suit.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

44-50



Put Your Conveyor Pipe to Work

You can give your cotton a thorough cleaning, opening and aerating, while it's being conveyed from the bale breakers to the picker room. The Murray Cotton Cleaning and Aerating Machine forms a part of the conveyor pipe, and vastly improves the stock before it is fed to the pickers.

The "Murray" takes up very little extra space, since it can be hung from the ceiling. Its supply of cotton is drawn through it by the suction of the conveyor pipe fan, no additional fan or increased draft being necessary. A further economical feature is the fact that the "Murray" requires practically no attention since the dirt is automatically disposed of through a chute at one end.

Handles 2,500 Lbs. Hourly.

2,500 pounds of cotton per hour can be cleaned, opened and aerated in the Murray machine at a power expenditure of only 3 to 5 H.P. The stock is given a thorough treatment by 114 revolving arms.

The Bowling Green Spinning Mills write us stating "The Opener we purchased from you is giving entire satisfaction in every way. In fact we think it is a wonderful machine."

THE MURRAY COMPANY, ATLANTA, GA.

Northern and New England Sales Representatives:
Aldrich Machine Works
P. O. Box 132, Providence, R. 1

Carolina Sales Representatives:
Carolina Specialty Co.
Brevard Court
Charlotte, N. C.

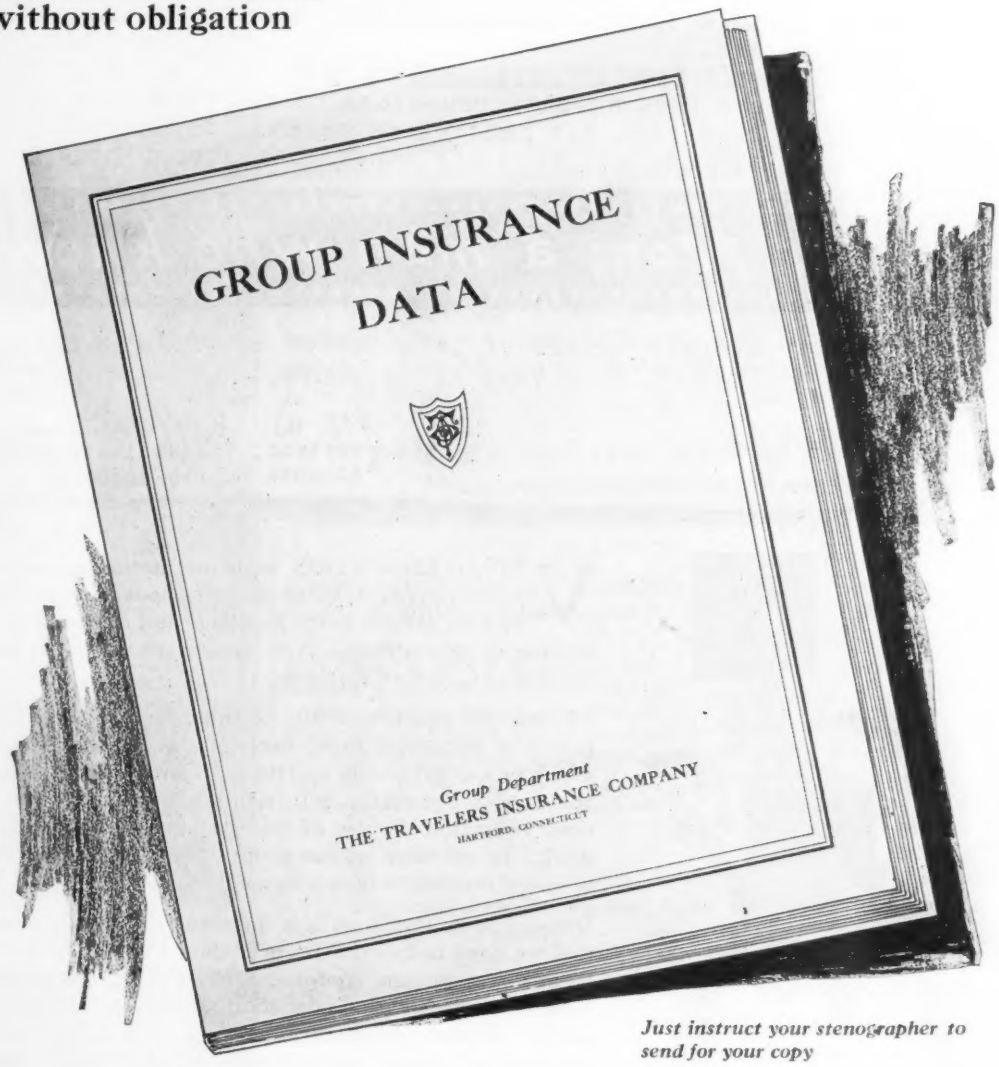
The Murray (PAT. PENDING)
COTTON CLEANING AND AERATING MACHINE

COTTON WELL OPENED IS HALF SPUN

A Portfolio for Executives

on a live business subject

Yours for the asking without obligation



Just instruct your stenographer to send for your copy

THE TRAVELERS INSURANCE COMPANY
Hartford

L. F. BUTLER, PRESIDENT

THE TRAVELERS INDEMNITY COMPANY
Connecticut

THE TRAVELERS

ACCIDENT, LIFE, LIABILITY, HEALTH, AUTOMOBILE, STEAM BOILER, COMPENSATION, GROUP, BURGLARY, PLATE GLASS, AIRCRAFT, MACHINERY

The Travelers has been selected for Group Insurance by 45% more employers than have chosen any other company

WILLIS A. SUTTON, SUPERINTENDENT · H. REID HUNTER, ASSISTANT SUPERINTENDENT · MARY W. POSTELL, ASSISTANT SUPERINTENDENT · R. L. McCULLOUGH, BUSINESS MANAGER

OFFICE OF
BOARD OF EDUCATION
AND
SUPERINTENDENT ATLANTA PUBLIC SCHOOLS
ATLANTA, GA.

Southern Theatre Equipment Co.,
100 Walton St., Atlanta, Ga.
Gentlemen:

Regarding the educational value of the motion picture in public schools, I wish to call your attention to the following points:

1.-"THE EYE IS THE PRINCIPAL GATEWAY TO THE MIND." We have five senses thru which impressions of the external world may be received, yet most of us receive far more impressions thru the eye than all other senses combined.

A letter from a man who knows

You may use any or all of this letter as you desire.
Very truly yours,

Joe W. Coffman
Supervisor, Visual Instruction,
Atlanta Public Schools.

VISUAL EDUCATION with the motion picture has already proven its value in city schools, and it will prove of even greater value in village and community schools because it accomplishes even greater results with less time and less experienced teachers.

Through the courtesy of Mr. Coffman, we are presenting each month in paragraph form, parts of a very enlightening letter which he has written us, and through Mr. Coffman also, we are able to give our textile mill friends valuable help and suggestions regarding the use of this system in community school work, the selection of the proper films, in fact the solution of every problem which may present itself.

Our service to textile mills is the result of years of experience, and we have installed Powers Motion Picture Projectors and theatre auditorium equipment in over 60 Southern mills. Whether it be a visual education system or complete motion picture theatre equipment, including screens, chairs, cooling systems, etc., we are ready to take the problem off your hands and turn the system back to you ready for operation.

May we present our special proposition to you?

Southern Theatre Equipment Company

WILLIAM OLDKNOW, President.

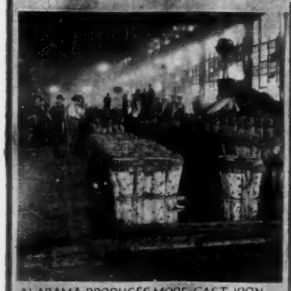
100 WALTON STREET
ATLANTA, GEORGIA

THREE TWENTY-EIGHT CALIFORNIA ST.,
OKLAHOMA CITY, OKLA.

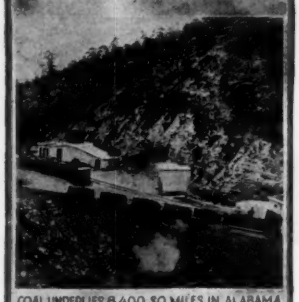
1907 COMMERCE ST.
DALLAS, TEXAS

ALABAMA'S STEEL MILLS PRODUCE 1,000,000 TONS ANNUALLY

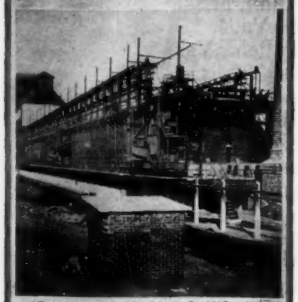
ALABAMA PRODUCES THE CHEAPEST PIG IRON IN THE WORLD AND IS THE FOURTH STATE IN ITS MANUFACTURE. HER 40 BLAST FURNACES HAVE AN ANNUAL CAPACITY OF OVER 3,000,000 TONS.



ALABAMA PRODUCES MORE CAST IRON PIPE THAN ANY OTHER STATE IN UNION. THIS AND OTHER IRON MOULDING INDUSTRIES FURNISH VAST SUPPLY OF TRAINED LABOR.



COAL UNDERLIES 8,400 SQ. MILES IN ALABAMA AVERAGE ANNUAL PRODUCTION OVER 16,000,000 TONS



1,171 BY-PRODUCT COKE OVENS IN ALABAMA PRODUCE 4,500,000 TONS ANNUALLY

ALABAMA IS THE THIRD STATE IN THE PRODUCTION OF IRON ORE. HER KNOWN DEPOSITS CONTAIN 1,700,000,000 TONS OF RED AND 27,000,000 TONS OF BROWN HEMATITE.

Textile Machinery Can and Should Be Manufactured in Alabama!

Radical changes in economical conditions during the past decade—greatly increased freight rates—the steady march westward of the country's center of population—high wages, brought about by keen competition—labor shortages—

These and other factors have caused an increase of more than 33⅓ per cent in the number of spindles in the Southern States during the past twelve years; the increase in New England States has been only about 9 per cent. This indicates that future expansion for the textile manufacturer is in the South.

That is why three-fourth of the Textile-Machinery distributed in the markets of the world is being sold in Southern States.

The magnitude of iron, steel and pipe industry in Alabama insures ample supply of skilled mechanics and foundrymen at all times.

The center of distribution for manufactured products is more accessible to Alabama than the New England States. If manufactured here where there is an unlimited supply of raw material (iron and steel), textile machinery could be marketed at less cost to the Southern mills.

The better climate, the better industrial temper, the happier living conditions, insure satisfactory labor. Freedom from those foreign elements of disturbing nature, obviates the labor troubles which so often menace the welfare of many other sections.

Locations are available in Alabama, where iron, coke and coal can be hauled from the source of supply by truck to the plant.

The most dependable electric power in the South (obtainable in Alabama) eliminates the possibility of excessive operating costs.

The manufacturer of Textile Machinery in Alabama opens an entirely new and extremely attractive field of industry—one that affords unlimited opportunity for development. Interested parties will be furnished with desired information regarding the possibilities of this industry, upon application to the Commercial Department of the Alabama Power Company.

See Our Exhibit at the International Textile Exposition—Oct. 29 to Nov. 3, 1923—Boston, Mass.

THE POWER THAT LIGHTS AND MOVES ALABAMA

ALABAMA POWER COMPANY

BIRMINGHAM, ALA.

THE FUN-FUL LINE

PLAYGROUND EQUIPMENT

349 Cotton Mills Using FUN-FUL!

A few of them

Pacific Mills—Columbia, S. C.
Columbia Mills—Columbia, S. C.
Wymojo Mills—Rockhill, S. C.
Woodside Mills—Greenville, S. C.
Pacolet Mills—Pacolet, S. C.
Drayton Mills—Spartanburg, S. C.
Monarch Mills—Union, S. C.
Langley Mills—Langley, S. C.
Grendel Mills—Greenwood, S. C.
Greenwood Mills—Greenwood, S. C.
Belton Mills—Belton, S. C.
Loray Mills—Gastonia, N. C.
Gray Mills—Gastonia, N. C.
Arlington Mills—Gastonia, N. C.
Flint Mills—Gastonia, N. C.
Cannon Mills—Kannapolis, N. C.
P. H. Hanes Mills—Winston-Salem, N. C.
Proximity Mills—Greensboro, N. C.
Durham Mills—Durham, N. C.
Roxboro Mills—Roxboro, N. C.
Tolar-Hart-Holt Mills—Fayetteville, N. C.
Hart Mills—Tarboro, N. C.
Pilot Mills—Raleigh, N. C.
Cardinal Mills—West Point, Miss.
Lauderdale Mills—Meridian, Miss.
Danville Mills—Danville, Va.
Schoolfield Mills—Schoolfield, Va.
Bonham Mills—Bonham, Texas.
Sherman Mills—Sherman, Texas.
Corsicana Mills—Corsicana, Texas.
Itasca Mills—Itasca, Texas.
Brazo Valley Mills—West, Texas.
Prendergast Mills—Prendergast, Tenn.
Davis Mills—Chattanooga, Tenn.
Avondale Mills—Birmingham, Ala.
Lanett Mills—Lanett, Ala.
Anniston Mills—Anniston, Ala.
Montgomery Mills—Montgomery, Ala.
Fulton Bag Mills—Atlanta, Georgia.
Exposition Mills—Atlanta, Georgia.
Calloway Mills—LaGrange, Georgia.
Moultrie Mills—Moultrie, Georgia.
Trion Mills—Trion, Georgia.
LaFayette Mills—LaFayette, Georgia.
Bibb Mills—Macon, Georgia.
International Mills—LaGrange, Georgia.

At the Brazilian Centennial Exhibition at Rio de Janeiro, Brazil, South America, which has just closed, HILL-STANDARD Equipment was awarded the gold medals.

Catalog on request

HILL-STANDARD CO.

Anderson, Our 22nd year Indiana

HOCKADAY WINS AGAIN!

THESE TESTS MADE BY THE AMERICAN TOOL WORKS CO. AT THEIR PLANT

FIRST COAT - 1/2 GAL.

SAMPLE NO.	SQUARE FEET.	HOW WORKED.	TIME (MIN.)
1	180	Fairly good	52
2	152	Tough	58
Hockaday	214	Very good	46
4	176	Fairly good	53
5	168	Very tough	68
6	164	Fairly good	52
7	168	Tough	59
8	164	Tough	58
9	168	Tough	62
10	168	Fairly good	53
11	165	Tough	58

SECOND COAT - 1/4 GAL.

SAMPLE NO.	SQUARE FEET	HOW WORKED.	TIME (MIN.)
1	76	Fairly good	33
2	72	Tough	30
Hockaday	108	Very good	20
4	64	Fairly good	24
5	60	Very tough	33
6	68	Fairly good	36
7	68	Tough	31
8	84	Tough	33
9	68	Tough	31
10	84	Fairly good	28
11	70	Tough	30

Requires 10% Less Time to Apply

Covers 25% More Surface

The American Tool Works Co., Cincinnati, did not guess—they took no one's word. Instead they got the facts. In the open market they secured enough paint of the leading brands to make a test. Hockaday won! Their report shows that Hockaday covered 25 per cent more surface in 10 per cent less time. Let us show you how to get the money saving facts. Write us.

THE HOCKADAY COMPANY
1823-1829 Carroll Avenue,
CHICAGO
O. H. Johnson, Mgr., Southern Office, Newberry, S. C.

Don't class Hockaday with "ready-mixed" paints. It's different. Hockaday comes in two parts, Body—a paste, and Reducer—a liquid.

HOCKADAY

THE WASHABLE PAINT FOR ALL INTERIORS

Tennessee-The Hea

WHO produces and markets more hosiery than any city in the South? Where is the largest mercerizing center in the South? Who produces more oil well machinery than any city in the country, exporting it as far as Siberia? Who manufactures more boilers than any other city in the South and ranks second in the country? Who turns out more plows, cedar chests and undertaking goods than any city in the South? Who produces more sawmill machinery than any city in the country? Where is the only factory in the world producing both the lumber and paper and fabricating wooden, wirebound, corrugated fibre and folding boxes? Who produces more medicines, refrigerators, gas ranges, shovels, sewer pipe and porcelain enameled steel than any other Southern city? Where is the pioneer electrical insulator manufacturing plant?

All of these industries are in TENNESSEE.

The Tennessee El

Heart of Industrial America

Tennessee's Plants Are Supplying the World

Tennessee's strategic position in the scheme of states—half-way between the Atlantic ports and the Gulf—coupled with adequate facilities of transportation, has placed her industries in close touch with domestic centers of distribution and the markets of the world. The development of this section as a manufacturing center for the Pacific Coast and the Far East is foreshadowed in the increased use of rail and water shipments to Gulf ports, thence via the Panama Canal to the west coast, China, Japan and the Far East.

The rapid growth in the South's domestic and foreign trade is reflected in the value of her manufactured products, which increased over 200 per cent in the last decade and equalled in 1920 the value for the entire country twenty years before. The output of Tennessee's mills has trebled in value in the last six years and, with her long and ever growing list of successful textile, wood-working and metal trade plants, increased industrial expansion is certain to take place within the next few years.

The trend toward the South, especially in the textile industry, is apparent to every wide-awake mill man. Many northern and eastern manufacturers, realizing that they cannot definitely overcome the disadvantages of high manufacturing costs, are finding the logical solution of their problems in the establishment of new plants in Tennessee.

Full information relative to the wonderful possibilities of this section furnished interested manufacturers upon request.

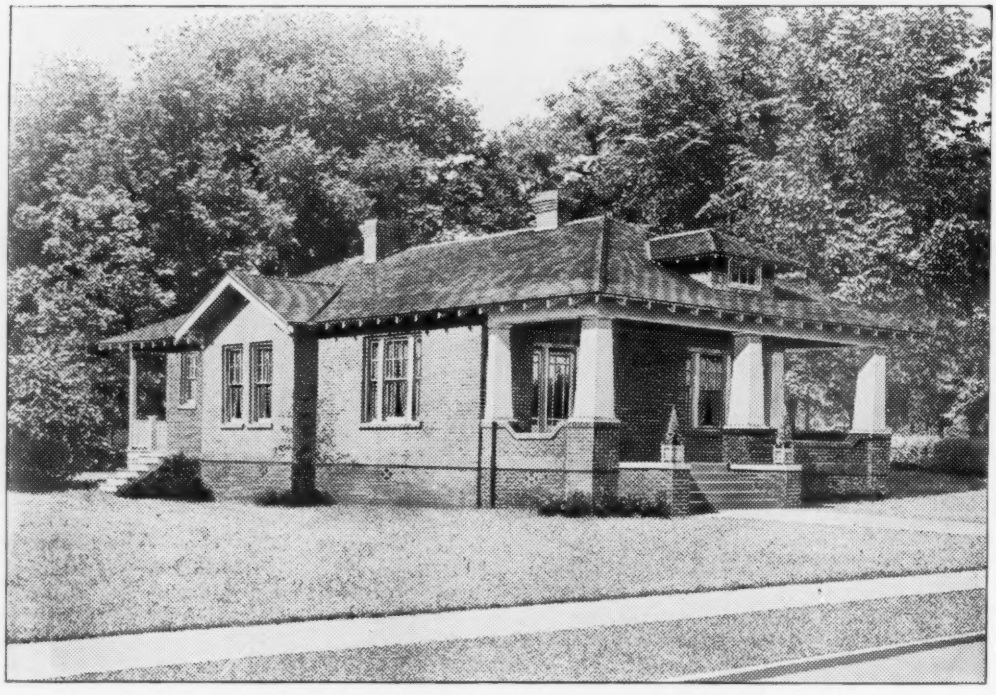
THE TENNESSEE ELECTRIC POWER CO.
CHATTANOOGA, TENNESSEE

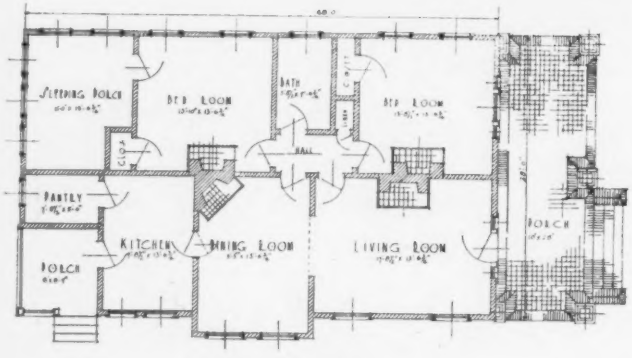
FIVE ADVANTAGES IN TENNESSEE

1. Ideal climate the entire year.
2. Raw materials of all kinds in abundance.
3. Market facilities — unsurpassed rail and water transportation.
4. Ample supply of intelligent and stable labor.
5. Continuous and reliable electric power at low cost.

Electric Power Co.

We Handle Every Building Detail





FLOOR PLAN
of the Minter Home Illustrated Above

Type of Minter Home selected for Superintendent's Residence by a leading Textile Firm. Exterior finish of this attractive home may be either brick veneer, as shown, or in wood.

You are delivered completed homes when you place your housing in our hands. Only one contract is necessary.

No matter what your building needs may be—one and two-story community houses, churches, stores, school houses, moving picture theatres, apartment houses or other structures—you can have them erected in exact accordance with your plans or those of your architect without being troubled by any detail.

All Minter structures are built of the best materials of the kind specified, are erected in minimum time and without loss of time, labor or materials.

The Minter System is the modern method of building that saves your time, your nerves and the money of you and your stockholders.

Write us today about the houses you need.

THE MINTER HOMES CO.

GREENVILLE, SOUTH CAROLINA

MINTER HOMES CORPORATION

HUNTINGTON, WEST VIRGINIA

Meet Georgia At Boston!

THE EMPIRE STATE OF THE SOUTH HAS UNPARALLELED OPPORTUNITIES TO OFFER THE MANUFACTURER.

EVER-INCREASING HYDRO-ELECTRIC POWER; TRANSPORTATION SERVICE TO MEET THE MOST RIGOROUS REQUIREMENTS; ADVANTAGEOUS INDUSTRIAL LOCATIONS; AN ABUNDANCE OF LABOR; CLIMATIC CONDITIONS THAT ARE INCOMPARABLE AND EDUCATIONAL FACILITIES OF A HIGH STANDARD.

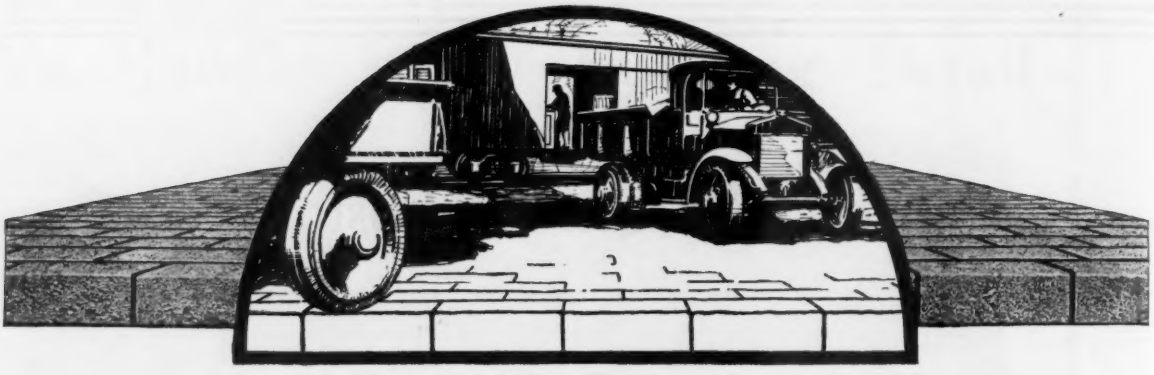
At the International Textile Show, Boston, Mass., Oct. 29 to Nov. 3, 1923, visit us at Dept. F. 520-521-522.

SEE OUR HYDRO-ELECTRIC DEVELOPMENT REPRODUCED IN BAS-RELIEF AND GET THE FACTS.

Every possible assistance and cooperation rendered by "live" Chambers of Commerce in all parts of Georgia, as well as through our organization.

Georgia Railway & Power Co.

Atlanta, Georgia



Industrial Driveways

—where heavy trucks on solid tires jolt and pound, where draft horses, delivering and taking away heavy loads strain and lunge—in such places there is just one pavement which, at the right cost, combines long endurance with a smooth yet skid-proof surface—it is the *Vitrified Brick Pavement.*

There are seemingly cheaper substitutes. Nevertheless, when first cost and annual upkeep are figured over the long years of service rendered, vitrified brick pavements invariably prove their economy.

Albion Shale Brick Company
Albion, Ill.
Alton Brick Company
Alton, Ill.
Barr Clay Company
Streator, Ill.
Binghamton Brick Company
Binghamton, N. Y.
Cleveland Brick & Clay Company
Cleveland, Ohio
Clydesdale Brick & Stone Co.
Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co.
Coffeyville, Kans.
Collinwood Shale Brick Company
Cleveland, Ohio
Corry Brick & Tile Company
Corry, Pa.
Francis Vitric Brick Company
Boynton, Okla.
Georgia Vitrified Brick & Clay Co.
Augusta, Ga.
Globe Brick Company
East Liverpool, Ohio.
Hammond Fire Brick Company
Fairmont, W. Va.
Hocking Valley Brick Company
Columbus, Ohio.
Independence Paving Brick Co.
Independence, Kans.
Mack Mfg. Company
Wheeling, W. Va.
C. P. Mayer Brick Company
Bridgeville, Pa.
Medal Paving Brick Company
Cleveland, Ohio.
Metropolis Paving Brick Co.
Pittsburg, Kansas.
Metropolitan Paving Brick Co.
Canton, Ohio.
Mineral Wells Paving Brick Co.
Mineral Wells Texas.
Moberly Paving Brick Company
Moberly, Mo.
Murphysboro Paving Brick Co.
Murphysboro, Ill.
Patton Clay Mfg. Company
Patton, Pa.
Peebles Paving Brick Company
Portsmouth, Ohio
Pittsburg Paving Brick Company
Pittsburg, Kansas.
Purington Paving Brick Company
Galesburg, Ill.
Southern Clay Mfg. Company
Chattanooga, Tenn.
Springfield Paving Brick Company
Springfield, Ill.
Sterling Brick Company
Olean, N. Y.
Streator Clay Mfg. Company
Streator, Ill.
Thornton Fire Brick Company
Clarksburg, W. Va.
Thurber Brick Company
Toronto, Ft. Worth, Texas.
Toronto Fire Clay Company
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Trinidad Brick & Tile Company
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Western Shale Products Company
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Westport Paving Brick Company
Baltimore, Md.

VITRIFIED
Brick
PAVEMENTS

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING CLEVELAND, OHIO

The Field of Our Experience

THE story of Lockwood-Greene success is told by the clients who come back for additional work. A list of clients contains the names of many we have served again and again; some have been with us from the beginning.

Twenty years ago we designed a plant for the manufacture of paper-mill felt. Eighteen years later this client decided to manufacture woolen textiles, and asked us to design an addition to the original plant. It is a long step from paper-mill felt to woolen textiles, but Lockwood-Greene experience covered the field.

Clients of Lockwood, Greene & Co. benefit by a breadth of experience probably unequaled in the engineering profession. From textile mills to newspaper plants; from military barracks to office buildings, there is hardly a branch of industrial engineering not included in the scope of Lockwood-Greene service.

An organization of architects and engineers, highly trained and skilled experts in every phase of engineering, makes such a broad service possible. In addition to these technically trained men, the organization includes men of general business and financial experience whose counsel is invaluable in the planning of new plants or the extension of old ones.

Whether you contemplate an immediate program of building or not, now is the time to go into consultation about it. Ask to have a Lockwood-Greene representative call on you. You are entitled to a copy of "Building with Foresight," which illustrates work done for others. A copy will be sent on request.

BUILDING WITH FORESIGHT

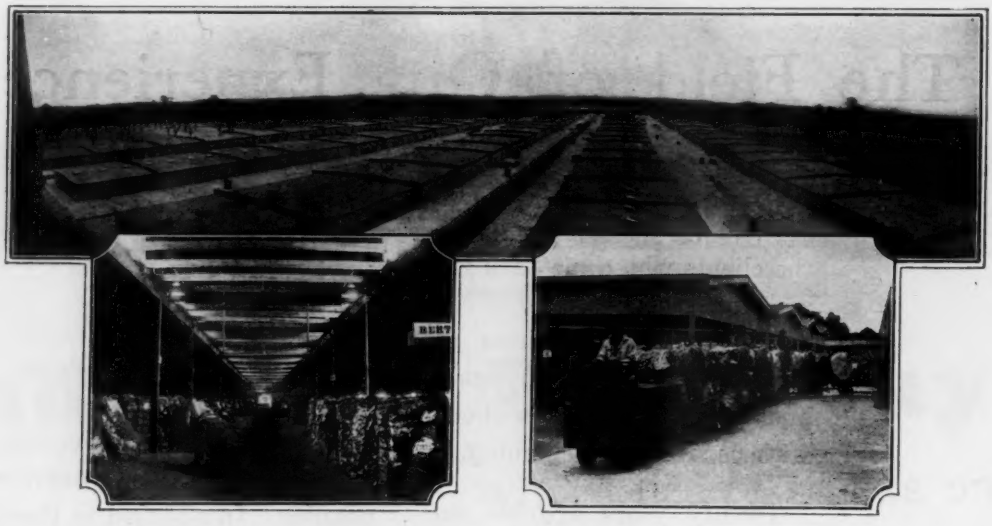
LOCKWOOD, GREENE & CO.
ENGINEERS

EXECUTIVE OFFICE, 24 Federal St., Boston 9

Boston Atlanta Chicago New York Detroit Cleveland Charlotte

Lockwood, Greene & Co. of Canada, Limited, Montreal

Compagnie Lockwood Greene, Paris, France



There are more picturesque but no more important factors in the textile industry than the storage of cotton

THE cotton storage plant of the Savannah Warehouse and Compress Company, one of the largest in the world, makes it possible to store 150,000 cotton bales at one time, with a capacity reaching 500,000 bales per year.

Simplicity and accessibility are the dominant features of the design, which has been adopted as a standard for warehouse construction by the U. S. Army and by the Warehousing Bureau of the Department of Agriculture. 300 railroad cars and 600 trucks or wagons can be handled at one time.

The planning, designing and the supervision of construction and equipment of this enormous warehouse was the work of our organization. Because of standardization of plans and dimensions, this huge plant was built at a saving from $500,000 to $750,000.

This organization of Engineers offers the services of a group of men experienced in the design and construction of storage buildings of every type.

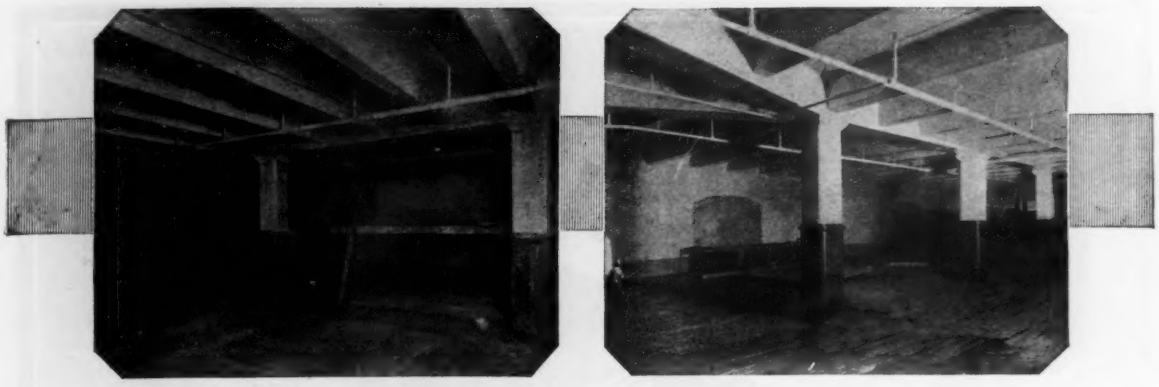
Arrange for a conference with a member of this organization, or write us about your problem.

J. E. SIRRINE & COMPANY

Engineers

Greenville **South Carolina**

SERVICE



These two unretouched photographs show the remarkable difference made by the application of Surlight—the whitest mill-white made.

Pure White Paint that Stays White

Surlight is the whitest mill-white paint made. This is an actual fact that is open to demonstration—results will show that in every case, under similar conditions and service, Surlight is whiter when applied, whiter when dry and stays whiter longer than any paint or enamel you can buy.

The ability of Surlight paint to *stay white* is responsible for many real savings. It makes every wall a light reflector—daylight is caught from all angles and diffused in soft, restful rays to workers' machines and benches. This naturally helps to increase production—in many cases as much as 8 to 12%. The light-reflecting properties of Surlight tend to reduce spoilage and this is an important factor in reduction of losses in both labor and material.

The factory interior brightened with pure white Surlight paint provides a cheerful, sanitary atmosphere—it helps to lighten corners and areas that were formerly dark and removes the temptation to allow dirt and rubbish to accumulate.

Surlight paint lasts long and eliminates the necessity of frequent repainting. It forms a tough defensive coat that dries to a smooth, hard non-porous surface, which will not collect dust, dirt or flying particles. It will not peel, check, crack, flake or fall off.

The Surlight Book
This book should be in the hands of everyone interested in mill-white paint for textile use. Send for copy.

Get This Interesting Book

We have prepared a very interesting book on the subject of Surlight Paint—what it is, what it does and various considerations of the effects that follow its use. Send for this book—it will be mailed gratis on request.

ST. LOUIS SURFACER & PAINT CO.

4211 Arlington Ave., St. Louis, Mo.

SURLIGHT

The Light Reflecting Wall Paint for Industrial Purposes

Distributor Service

BOSTON, MASS.
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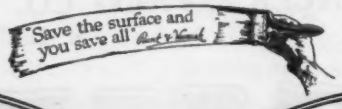


For Modern Textile Mills

A MYRIAD of windows to let in abundant daylight is one essential of the modern textile mill.

Another—of equal importance—is an OJACO Mill-Whitened interior that refracts and diffuses this light onto men, materials and machinery.

OJACO Mill White is an investment—never an expense. Applied to mill walls and ceilings, it helps to improve workmanship, increase production and reduce the cost of artificial lighting.

Consult the nearest OJACO distributor for further details—or write to us direct.

Oliver Johnson & Co., Inc.
Paint Makers since 1833
PROVIDENCE, R. I.

PERMANENT ROOF CONSTRUCTION

A series of articles by the Technical Staff of the Richardson Research Laboratories, showing what modern science has done to perfect the materials and methods of roof construction

No. 6. The proper protective surfacing for waterproofing bitumen

From previous articles in this series, you have read that a Viskalt Membrane Roof assures you of two things:

(1) A pliant, durable, adhesive waterproofing bitumen, free from destructive chemical elements and absolutely impervious to water.

(2) A felt foundation which, in spite of severe weathering, will permanently hold this bitumen fast to the roof.

In addition to these, a new mineral surfacing has been developed, which gives to Viskalt Membrane Roof the utmost in protection, and the maximum staying power possible in bituminous waterproofing.

How this improvement developed

For many years, as you know, it has been customary to surface roofs with a heavy coating of either slag or gravel, using from 300 to 400 pounds per 100 square feet. The purpose of this material was primarily to protect the bituminous mat beneath from the destructive effects of the sun's rays. In addition, however, this coating was applied to bind or hold in place a bituminous waterproofing which lacked sufficient natural cohesiveness of its own.

Slate surfacing is used on roll roofing or asphalt shingles as protection from the destructive action of the sun, although because of the greater covering capacity of the slate granules, only one-tenth the weight is required as for slag or gravel roofs.

Picture to yourself the drop in weight from 400 pounds of gravel to the 30 pounds of slate granules generally used on prepared roofing or shingles—a drop in weight accompanied by *increased protective efficiency.* Then imagine a surfacing material which has a greater covering capacity even than slate granules.

Complete protection from the sun

Such a material is the new Viskalt Mineral Surfacing, a finely divided black opaque mineral matter, of which less than three pounds is required to give 100 square feet of roof complete protection from the sun's rays.

This black opaque mineral matter absorbs light to a remarkable degree; not even the ultra violet rays of the sun can penetrate it. When properly placed, it thoroughly covers the entire area; in fact, a keen microscopic examination will show that none of the bitumen below is exposed.

Such complete coverage is also due to the peculiar qualities of Viskalt Compound, to which the mineral surfacing readily adheres and becomes an integral part of the roof itself.

There are further advantages of this unique material. By removing the enormous weight of slag or gravel it gives you a far greater percentage of actual waterproofing, together with a considerable decrease in dead weight on the roof. Moreover, it is a clean, sanitary covering which collects no debris to clog your outlets and down spouts.

Viskalt Mineral Surfacing, therefore, not only protects a Viskalt Membrane Roof from the destructive rays of the sun, but also gives it maximum stability.

For further facts about permanent roof construction, consult the article for next month.

Viskalt is made by a firm backed by over fifty years of manufacturing experience. There is a Viskalt compound for every waterproofing need. For complete specifications just write the Construction Materials Division, Dept. 44-F

The RICHARDSON COMPANY
Lockland (Cincinnati), Ohio
Melrose Park (Chicago), Illinois New Orleans, La.

Viskalt
Pliant Under Stress

RICHARDSON *Product*
"1868"
From the makers of Richardson Roofing (including Flex-a-Tile Housetops), Viskote, Wall Board and similar products

©1923, The Richardson Company

Your Last Chance!
Don't Let It Pass!

Business getters who want to be in with the business makers are rapidly taking spaces for their coming exhibits at the

INTERNATIONAL TEXTILE EXPOSITION

Under the Auspices of Textile Exhibitors' Association, Inc.

Mechanics Building, Boston, Oct. 29 to Nov. 3

There are still some very valuable spaces open to those who act quickly. Write now, if you want to show your line at this great exhibition of Cotton, Woolen, Silk and Knitting Machinery, and the allied industries. Floor plans and specification blanks will be forwarded at once.

For further information address:

CHESTER I. CAMPBELL, General Manager
Executive Offices, 5 Park Square, Boston, Mass.

Thousands of Buyers Will See Your Exhibit

The fame of New England as the center of the Textile Industry is known all over the world.

The International Textile Exposition

Under the Auspices of the Textile Exhibitors' Assn., Inc.
Mechanics Building, Boston, Oct. 29 to Nov. 3.

Will be the largest display of Cotton, Woolen, Silk and Knit Goods Machinery and the Allied Industries, ever presented, anywhere. This, coupled with the fact that all machinery will be in actual operation, showing "Cloth in the Making," indicates a public attendance of fully 100,000 at this most interesting exhibition.

By special arrangement the management is able to offer a few very desirable spaces. For particulars and plans write

CHESTER I. CAMPBELL, General Manager,
Executive Offices, 5 Park Square, Boston, Mass.

GEORGE DOWMAN

610-611 Walton Building, Atlanta, Ga.

YOU CAN VENTILATE AT LOW COST WITH CALLAHAN SASH OPERATORS

Seven Callahan Features

Convenience
Economy *Compactness*
Safety *Neatness*
Tightness *Ease*

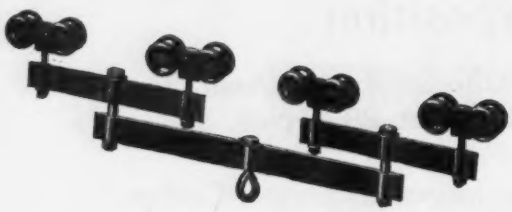
Invigorating fresh air, a natural resource to plant production, is yours with only the initial cost of mechanical sash operators. Callahan Sash Operators are built to serve you on any type of pivoted or hinged sash—wood or metal—with practically no maintenance expense.

Tell us of your desires—your difficulties—whether you have old or new buildings under consideration. Our specialized experience is at your disposal without obligation.

THE T. J. CALLAHAN COMPANY

803 S. PERRY ST. DAYTON, OHIO

WAGNER OVERHEAD CONVEYING EQUIPMENT



IS IDEALLY ADAPTABLE TO COTTON MILL OPERATIONS CONSERVES LABOR---SAVES TIME AND FLOOR SPACE

Do your trucking on the ceiling and consolidate your conveying and hoisting operations.

Wagner Equipment includes a complete line of Switches, Crossovers, Curves, and Cranes. Carriers are equipped with high grade roller bearings and can be furnished with "Hyatt" Roller Bearings if desired.

Write for Catalogue

Wagner Manufacturing Company, Cedar Falls, Iowa.

BOCA SOLID STEEL SASH

Because of its rigid construction and three point weathering this sash has been approved by the Board of Education of the City of New York, over sixty thousand square feet of sash having been installed to date.

Adaptable to all types of high-class building construction, private, public, and institutional.

Catalog on request.

The Bogert & Carlough Co., Paterson, N. J.

Public School No. 10

GEORGE DOWMAN

610-611 WALTON BLDG.
ATLANTA, GA.

"DOWMAN SERVICE" IS KNOWN ALL OVER THE SOUTH. TAKE ADVANTAGE OF THIS SERVICE WHEN IN NEED OF ANY OF THE FOLLOWING:

FIRE PROOF DOORS
SOLID STEEL SASH
HOLLOW METAL WINDOWS
STEEL CASEMENTS
VENTILATORS
METAL CEILINGS
STEEL BUILDINGS
METAL LATH
STEEL FENCE
SASH OPERATORS
OVERHEAD CARRIERS
ETC.

SEND FOR CATALOGS AND PRICES

Southern Selling Agent for the Products on These

CONTRACTORS AND SALES ENGINEERS

Right in your midst---

To be exact, in Statesville, N. C., there is a Maryland Metal Building which was erected complete in 70 working days for the Turner Foundry Company, Inc.

This is a 70 x 135 building and will last the Turner Foundry Company a lifetime, because it is constructed of 24 gauge Lyonore Metal, the greatest rust-resisting metal on the market today.

THE MARYLAND METAL BUILDING PORTABLE YET PERMANENT WITH Lyonore Metal

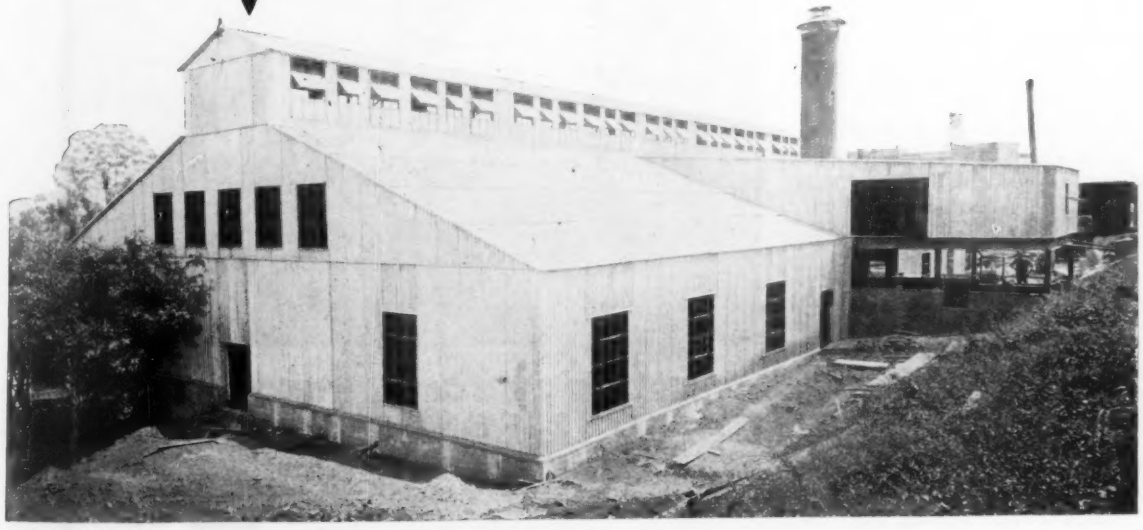
This building, like all Maryland Buildings, contains many features which places it in a category of its own. Every building is constructed to meet every individual's particular requirements, whether a watchman's booth to a complete factory building.

Our Chief Engineer, Mr. Fred B. Meisenholder, will be pleased to give you full information about a Maryland Metal Building for use as a factory or to increase space in some congested department. Write him, personally, today.

MARYLAND METAL BUILDING COMPANY

ENGINEERS—MANUFACTURERS

RACE & McCOMAS STS. BALTIMORE, MD.



Pages—Quality Products plus "Dowman Service"

VARIETY FIRE DOOR COMPANY

61 CROSS-HORIZONTAL FOLDING DOORS
ERECTED ON POSTS 7½ INCHES x 7½ INCHES
AMERICAN RAILWAY EXPRESS COMPANY'S BLDG.
CHICAGO, ILLINOIS

MANUFACTURERS OF A
COMPLETE LINE OF LABELED
FIRE DOORS
ROLLING STEEL DOORS
HOLLOW METAL DOORS
KALAMINE DOORS
SAINO DOORS
VAMANCO COUNTER BALANCED
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TIN CLAD DOORS
PRESSED STEEL FRAMES
STEEL STOREROOM DOORS

VARIETY FIRE DOORS

2958 CARROLL AVE. CHICAGO, ILL.

GEORGE DOWMAN 610-611 WALTON BLDG. ATLANTA, GA.

Southern Selling Agent for the Above Products

CYCLONE FENCE

The Cyclone Fence Company offers textile mills unusual advantages in the fencing of industrial property.

Speed, quality, efficiency and intelligent application of fence to grounds enclosed are all combined in Cyclone Service. Every fencing problem is handled professionally and completely. Satisfaction guaranteed.

Our years of experience in fencing thousands of industrial plants, among them hundreds of textile mills, is at your disposal. Let us know your requirements. Fencing, wire or iron, built for any purpose.

Write Dept. 35 for literature including specifications and details of Cyclone Fence construction. No obligation.

Cyclone Invincible Chain Link Fence Enclosing Property of International Cotton Mills, LaGrange, Ga.

CYCLONE FENCE COMPANY

Factories and Offices: Waukegan, Ill.; Cleveland, Ohio; Newark, N. J.; Fort Worth, Texas; Oakland, Calif. (Standard Fence Co.); Portland, Ore. (Northwest Fence & Wire Works).

The "Red Tag" — The Mark of Quality

PROPERTY PROTECTION PAYS

LIST *of* MEMBERS

Each has subscribed to and is maintaining the highest standards of practice in its editorial and advertising service.

Advertising and Selling
American Architect & Architectural Review
American Blacksmith, Auto & Tractor Shop
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint & Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automobile Journal
Automotive Industries

Baker's Helper
Bakers Weekly
Boiler Maker (The)
Boot and Shoe Recorder
Brick and Clay Record
Building Age & The Builders Journal
Buildings and Building Management
Building Supply News

Canadian Grocer
Canadian Machinery & Manufacturing News
Canadian Railway & Marine World
Candy and Ice Cream
Chemical & Metallurgical Engineering
Clothier and Furnisher
Coal Age
Concrete
COTTON

Daily Metal Trade
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter

Electric Railway Journal
Electrical Merchandising
Electrical Record
Electrical World
Embalmers' Monthly
Engineering and Mining Journal-Press
Engineering News-Record

Factory
Farm Implement News
Fire and Water Engineering
Foundry (The)
Furniture Manufacturer and Artisan

Garment Weekly (The)
Gas Age-Record
Good Furniture Magazine
Grand Rapids Furniture Record

BUYING
as affected by
SELLING

IT IS to your interest to know that goods are well sold, as well as well made. You have to pay the cost of selling just as you have to pay for the cost of manufacturing. Think it over.

And the cost of selling is no small item. In some cases it costs more to sell goods than to make them. The seller who clings to antiquated, expensive methods of selling is no more entitled to your patronage than the one who runs an out-of-date factory, because you have to pay the additional costs in either case.

If the waste is to be squeezed out of selling, the buyer cannot escape a share of the responsibility in bringing it about.

THIS means recognizing the efforts of those sellers who have adopted modern, economical methods of selling, and one of these beyond any question is good advertising in good Business Papers.

Advertising not only cuts the cost of selling, but it increases production volume and lowers manufacturing costs. It standardizes quality, and is a guarantee of good faith.

You are invited to consult us freely about Business Papers or Business Paper Advertising

LIST *of* MEMBERS
(*continued*)

Haberdasher (The)
Hardware Age
Hardware & Metal
Heating and Ventilating Magazine
Hide and Leather
Hospital Management
Hotel Monthly
Hotel Review

Illustrated Milliner
Implement & Tractor Trade Journal
Industrial Arts Magazine
Industrial Engineer
Inland Printer
Iron Age
Iron Trade Review

Lumber
Lumber World Review

Manufacturers' Record
Marine Engineering & Shipping Age
Marine Review
Millinery Trade Review
Mill Supplies
Modern Hospital (The)
Motor Age
Motorcycle and Bicycle Illustrated
Motor Truck
Motor World

National Builder
National Cleaner & Dyer
National Laundry Journal
National Miller
National Petroleum News
Nautical Gazette
Northwest Commercial Bulletin

Oil News
Oil Trade Journal

Power
Power Boating
Power Plant Engineering
Printers' Ink
Purchasing Agent

Railway Age
Railway Electrical Engineer
Railway Engineering & Maintenance
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rock Products
Rubber Age

Sanitary & Heating Engineering
Shoe and Leather Reporter
Shoe Retailer
Southern Engineer
Sporting Goods Dealer

Tea and Coffee Trade Journal
Textile World

Welding Engineer
Western Contractor
Wood-Worker (The)

THE ASSOCIATED BUSINESS PAPERS, INC.
JESSE H. NEAL, *Executive Secretary*
HEADQUARTERS: 220 West 42nd STREET NEW YORK CITY

SOUTHERN RAILWAY SYSTEM

THE SHORT LINE BETWEEN NEW ENGLAND

—AND—

THE SOUTH

Maintaining a Twenty-Four Hour Schedule Between

NEW YORK

—AND—

ATLANTA

A DOUBLE TRACKED TRUNK LINE EQUIPPED WITH EVERY MODERN DEVICE FOR SAFE AND RAPID TRANSPORTATION

THE ROUTE OF THE

"New York and New Orleans Limited"

—AND—

"The Piedmont Limited"

"There is a Cotton Mill for every mile along our Line"

Attractive Map and Descriptive Literature on Request.

W. H. TAYLOE,
Passenger Traffic Manager,
Washington, D. C.

GEO. C. DANIELS,
New England Passenger Agent
246 Washington St.,
Boston, Mass.

THE SOUTHERN SR SERVES THE SOUTH

H. F. CARY,
General Passenger Agent,
Washington, D. C.

R. H. DeBUTTS,
Eastern Passenger Agent,
152 West 42nd Street,
New York, N. Y.

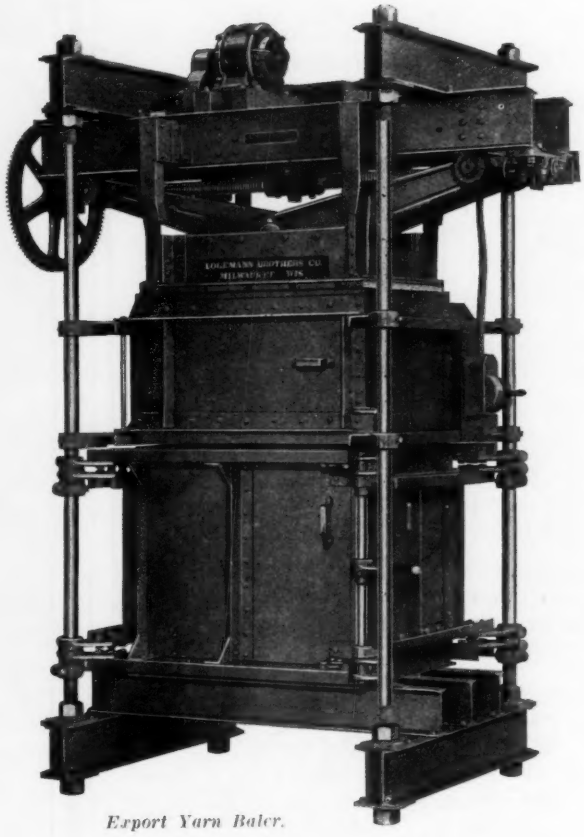
J. C. BEAM,
Assistant General Passenger Agent,
ATLANTA.

"The Southern Serves the South"

LOGEMANN

Hand-Belt-Electric-Hydraulic

Baling — Presses



Export Yarn Baler.

FROM year to year, hundreds of new names are added to the list of *LOGEMANN* baling-press users in the textile field.

Every year, repeat orders from users of *LOGEMANN* baling-presses increase steadily, denoting the satisfaction derived from this equipment.

BUT —

Until every mill-owner, superintendent, and operator, is familiar with the *LOGEMANN* line of balers for yarn, waste and finished goods, our advertising has not accomplished its purpose.

We solicit your inquiries.

LOGEMANN BROTHERS CO.

Main Office & Works - Milwaukee, Wis.

The TEXACO Line

Texaco Lubricants are carefully prepared to meet practical conditions and each lubricant is carefully tested in many plants before it is marketed for the purpose intended.

TEXACO SPINDLE OILS

TEXACO TOP ROLL LUBRICANT

TEXACO COMB BOXES

TEXACO LOOM OIL

TEXACO MACHINE OILS

TEXACO LIQUID GREASES

TEXACO MOTOR AND GENERATOR LUBRICANTS

TEXACO TURBINE OILS

TEXACO ENGINE OILS

TEXACO CYLINDER OILS
A grade for every condition of heat, pressure, character of water, speeds, etc.

TEXACO AIR COMPRESSOR LUBRICANTS

TEXACO DIESEL ENGINE LUBRICANTS

TEXACO OIL AND GAS ENGINE LUBRICANTS

In short, we can furnish you with a scientifically correct lubricant that will increase the operating efficiency of any of your power units, auxiliaries and machines.

These lubricants are in use in numbers of the most carefully operated textile mills and power plants, not only in this country, but throughout the world.

We shall be glad, at all times, to answer any question relating to the use or application of lubricants, and we would thank you to address inquiries to our nearest district office.

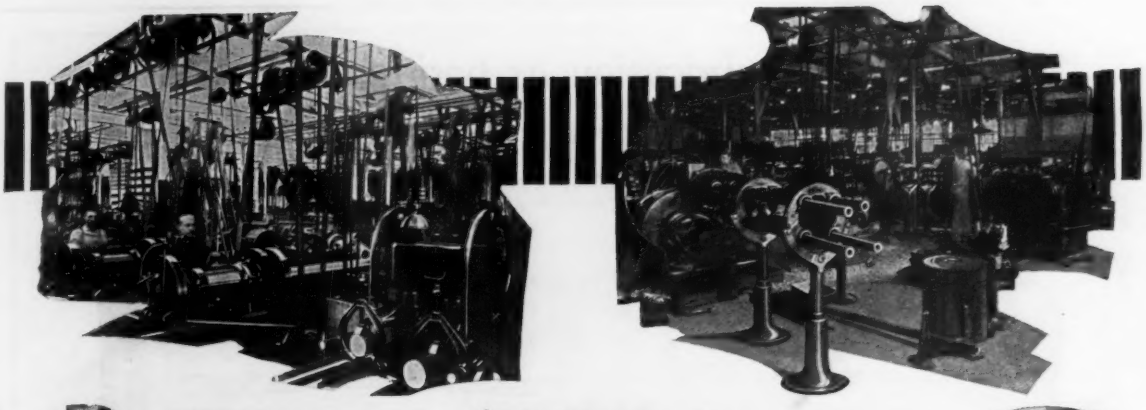
The Texas Company, U. S. A.

Texaco Petroleum Products

Dept. O, 17 Battery Place, New York City

Atlanta	Chicago	El Paso	New Orleans	Oklahoma City
Boston	Dallas	Houston	New York	Philadelphia
Billings	Denver	Jacksonville	Norfolk	Pittsburgh

Branches the World Over



Factors in Strom BALL BEARINGS Supremacy

No. 5—Cutting Off Stock and Machining

To assure uniformity in ball-bearings successive operations must bear exact relation to each other. Precise co-ordination in this particular is attained at the STROM plant by automatic machines which cut, bore, face, and ream—without removal of the bar from its chuck. One more small cut, beveling the edge, and the ring is ready for the hardening room. This is another reason why STROM guaranteed ball-bearings, for new or replacement work, put winged feet on Power—

"Wherever a Shaft Turns"

(1979)

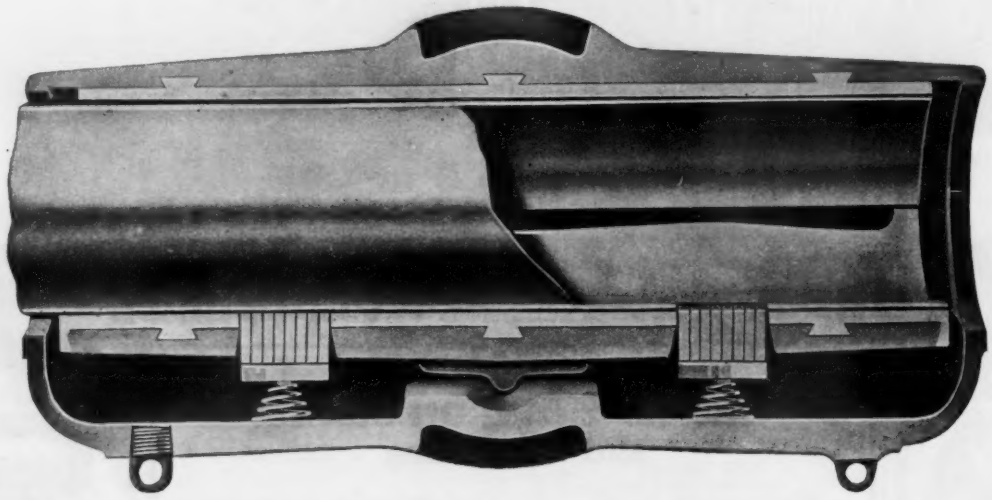
Strom BALL BEARINGS

U. S. Ball Bearing Mfg. Co.
4544 Palmer St., Chicago

An Organization Built for Precision

Scientific in Principle and Practice

Lubrication as positive as the flow of sap in the spring



What about your investment ten years from now? That is the important question

When we say that a Dodge capillary bearing will be in every respect as efficient and economical after ten years' service as when first installed we are backed by actual performance records under average operating conditions.

Laboratory tests are not made under average conditions—they offer no guarantee of future efficiency—they give no warning of broken parts, scored shafts and expensive replacements.

What you want is a time-tested bearing—you want your investment protected for many years. Performance of the past is a safe guarantee of the future.

The Dodge Capillary bearing combines proper bearing area, positive lubricating means and good babbitt, the three vital requisites of an efficient bearing.

Lubrication by capillary attraction is positive and unfailing. An absolutely uniform and unbroken film of clean lubricant is constantly maintained between shaft and liner. There are no moving parts in the capillary bearing—hence no churning of the oil—dirt settles to the bottom, where it belongs, and stays there.

An installation of Dodge capillary bearings represents a moderate first cost—insures low upkeep and substantial dividends in power savings. Buy them from your local Dodge dealer on the immediate delivery basis.

Read what these users say—

After 21 years service—
"Our experience leads us to believe that Dodge Capillary bearings are the most dependable of all types for continuous service."

Running at 2300 R. P. M. for ten years—
"This line shaft (2300 R. P. M.) has been operating for ten years and during that time we have not had *any* trouble."

Ten years service—never a hot bearing—
"We are glad to state that your capillary bearings continue to give satisfaction. We have never had a hot bearing where they have been used."

Another ten year user—
"Have been using Capillary bearings for ten years and have the first complaint to make."

"None better on the market"
"Your capillary bearings are giving us very satisfactory service—we believe there are none better on the market."

Names on request.

DODGE

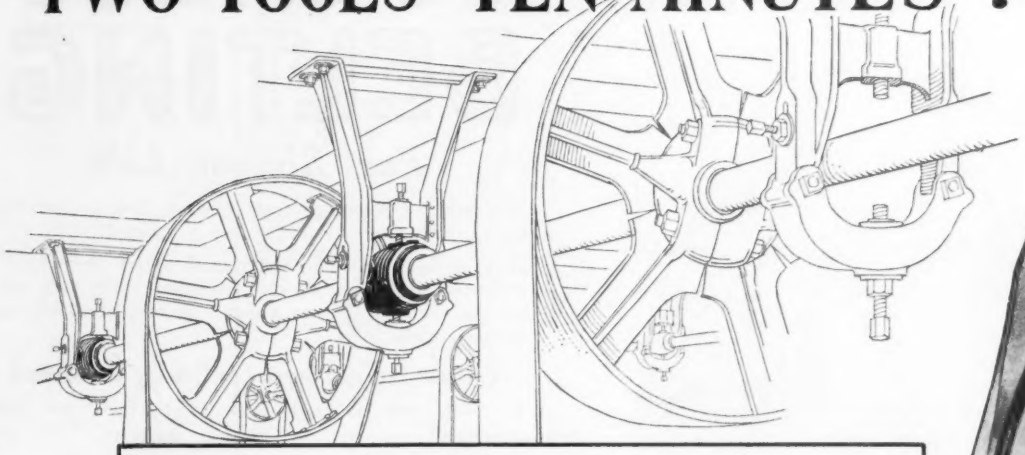
Capillary Bearings

Dodge Manufacturing Corporation

General Office: Mishawaka, Indiana Works: Mishawaka, Indiana, and Oneida, N. Y.

New York Philadelphia Pittsburgh Boston Cincinnati Newark Chicago
Atlanta Minneapolis St. Louis Houston Seattle San Francisco

TWO TOOLS-TEN MINUTES !



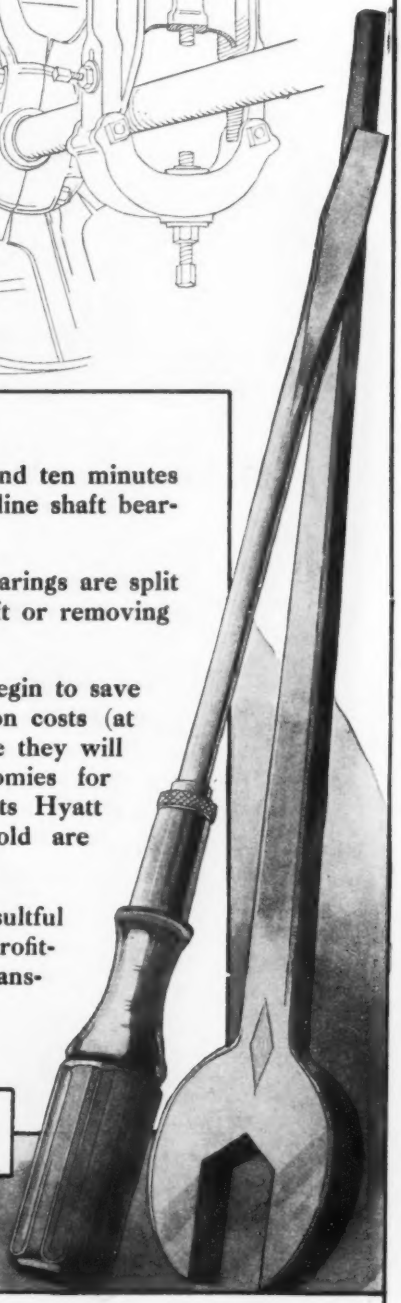
No delay to production!

Two tools—a wrench and a screw driver—and ten minutes are all you need to change over from plain line shaft bearings to Hyatt roller bearings.

You need not undress the shaft—Hyatt bearings are split and go right on without taking down the shaft or removing belts, pulleys, collars and couplings.

At once your Hyatt roller bearings will begin to save power (at least 15%) and reduce lubrication costs (at least 80%, oil and labor) and being durable they will effect these worthwhile economies for many years. In many plants Hyatt bearings 20 to 30 years old are still giving excellent service.

Make this simple but resultful changeover now and profitably cut your power transmission costs.



These bearings are an investment—they will pay for themselves by the power, oil and labor they save in about a year. And will give years of economical service with little attention.

'Phone The Nearest Mill Supply Dealer

Hyatt Roller Bearing Company

Newark, N. J.

Pacific Coast Address: Hyatt Roller Bearing Company, San Francisco, Cal.

For Lower Upkeep

COCHECO BELTING

For Longer Life

You will get a service from *Cocheco Belting* that will return, with *big interest*, the money invested.

Every inch is backbone center stock—extra heavy leather—tanned by the slow, old fashioned white oak bark process, curried by our special method, stretched and properly dried.

Cocheco Superior Service is Quickly Recognized

It needs but a short trial to convince you that *"Cocheco"* is a superior belting in stock, build and workmanship.

OUR GUARANTEE: Money Back if not as Represented

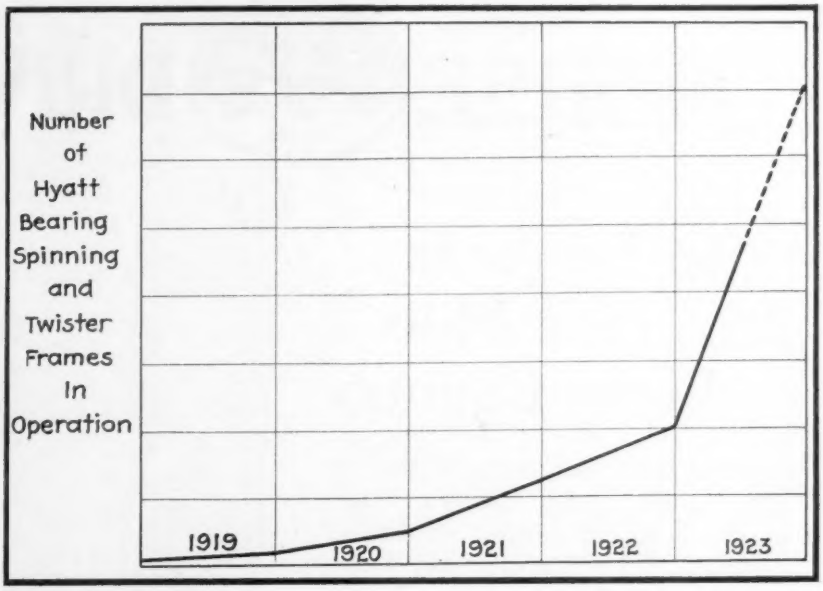
Be sure to write us

I. B. WILLIAMS & SONS

Dover, New Hampshire, U. S. A.

14-16 N. Franklin St. Chicago, Ill.
71-73 Murray St. New York, N. Y.
157 Summer St. Boston, Mass.

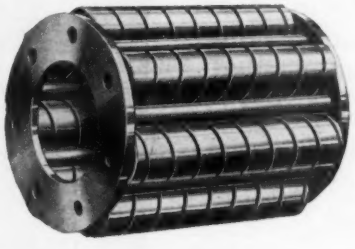
Another Significant Curve!



Ever Increasing Use of Hyatt Bearing Spinning and Twister Frames

The rapidly increasing use of Hyatt roller bearing equipped spinning and twister frames in this country and abroad is not an accident.

Far-sighted mill men, recognizing the economical and dependable operation of frames equipped with these modern bearings, have specified them and are now reaping the advantages.



Frames running easily in Hyatt bearings require less power ($\frac{1}{2}$ H.P. per frame less, by tests); require less lubrication (80% less oil and labor); they are smoother in operation and the bearings are durable, requiring no adjustment or replacement throughout the life of a frame.

The entire cost of securing these worth while economies is only about $35.00 per frame and the first cost is the last cost.

You are certainly interested in anything as practical as Hyatt bearings have proven to be that will decrease your cost per yard. Include this important item in your frame specifications or write us for more complete information.

HYATT ROLLER BEARING COMPANY

Newark Detroit Chicago San Francisco
Worcester Milwaukee Huntington Minneapolis Philadelphia
Cleveland Pittsburgh Buffalo Indianapolis

MORSE SILENT CHAIN DRIVES

THE MORSE ROCKER JOINT

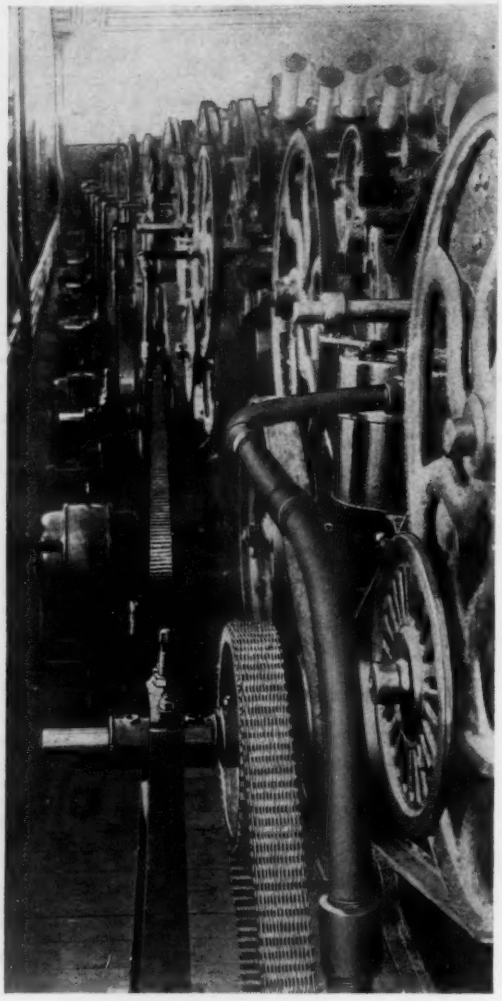
Saving Power In the Finest Mills In the Country

The selection and installation of Morse Silent Chain Drives result from the positive points of Morse superiority. To summarize, these principal advantages of the Morse Silent Chain Drive as against other forms of drives are:

Lower Upkeep Cost
Less loss time account of repairs
Less labor to maintain
Less liability to abuse
Better conditions of cleanliness
More Production

Morse Silent Chain Drives are dependable, require but little floor space and have a surprisingly long life. Their use in mills is unexcelled.

Our Sales Engineers are thoroughly trained in the fine points of power transmission and will be glad to cooperate with you and assist without obligation.



MORSE CHAIN CO., ITHACA, N. Y.

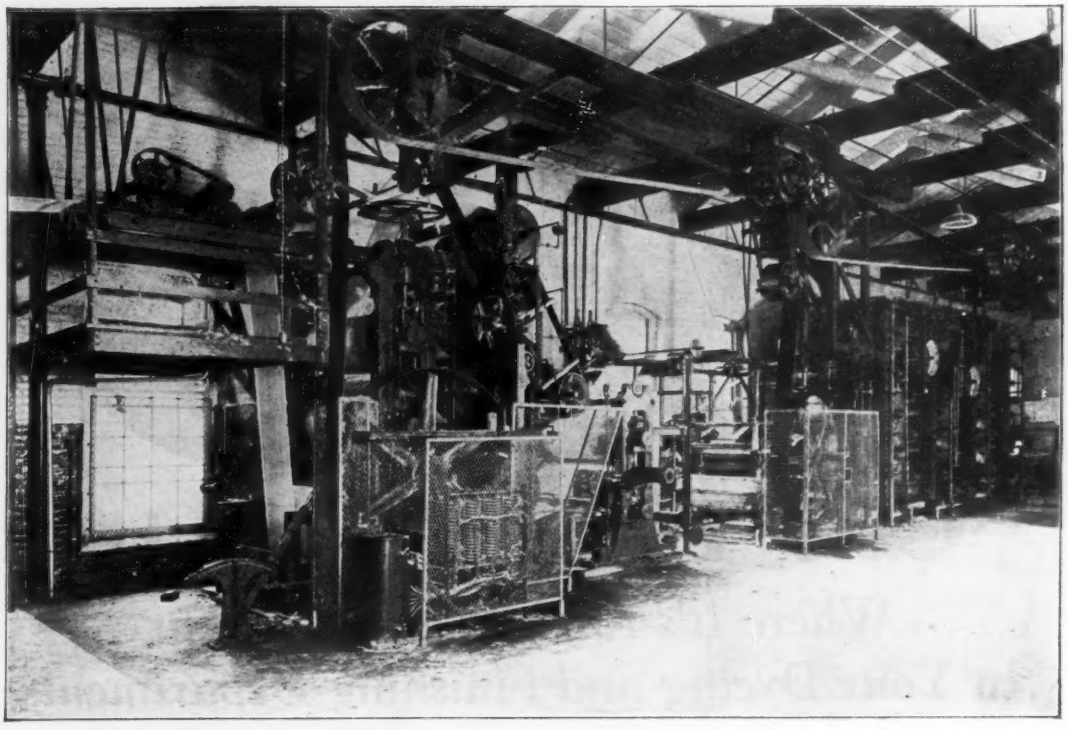
There is a Morse Engineer near you

ATLANTA, GA...Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Avenue
BOSTON, MASS.....141 Milk St.
CHARLOTTE, N. C.....404 Commercial Bank Bldg.
CHICAGO, ILL.....Merchants L & T Bldg.
CLEVELAND, OHIO.....Engineers Bldg.
DENVER, COLO.....1761 Wazee St.
DETROIT, MICH.....7601 Central Avenue
KANSAS CITY, MO.
Finance Bldg., Morse Eng'rg Co.
NEW YORK CITY.....30 Church St.
MINNEAPOLIS, MINN.,
So. 3rd St., Strong-Scott Mfg. Co.
MONTREAL,
St. Nicholas Bldg., Jones & Glasco, Reg'd
PHILADELPHIA, PA.....Franklin Trust Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CAL.....Monadnock Bldg.
ST. LOUIS, MO., Chemical Bldg., Morse Eng'rg Co.
TORONTO,
Bank of Hamilton Bldg., Jones & Glasco, Reg'd
WINNIPEG, MAN.
Dufferin St., Strong-Scott Mfg. Co.

Shear Spin Sprocket

Spring Sprocket

"Morse" is the guarantee always behind the efficiency, durability and service



FINISHING MACHINERY IN RANGE

The greatest single factor in lowering production costs

Washing, soaping, tentering, drying, starching, cooling, calendering and winding—these operations are among many which lend themselves to range finishing.

Three men only are required to operate such a range.

Ordinarily twelve men would be required if these machines were operated singly.

Then there is the advantage of continuous production, more uniform products and a saving in seconds by elimination of stop and start waste.

Finishing Machinery in Range is particularly adaptable to cotton goods in the piece—bag cloth, print cloth, chambrays, ginghams, heavy lawns, sheetings, shade cloth and other generally recognized lines.

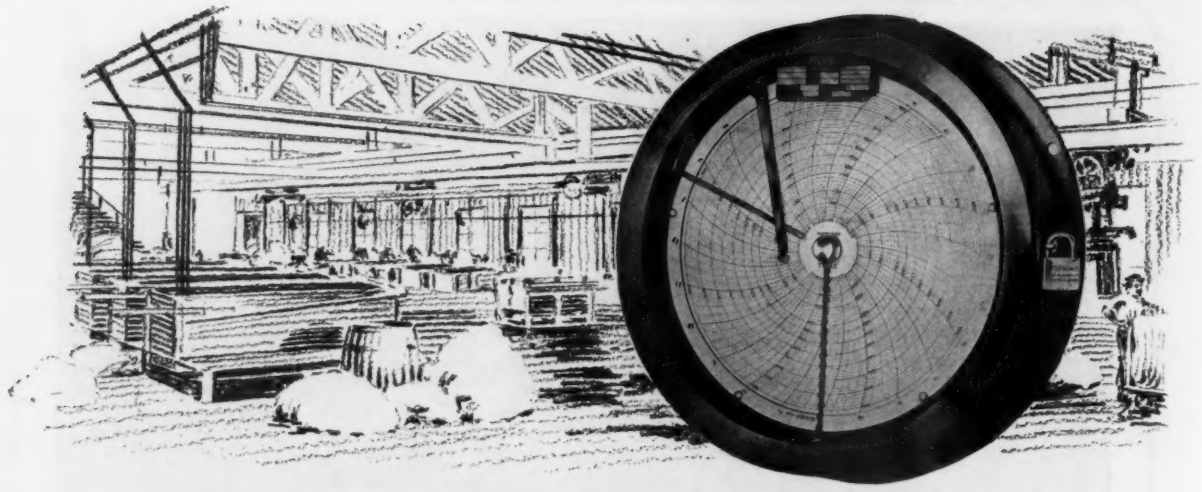
No matter how many finishing operations your product requires, get in touch with us about putting your machines in range; the saving is often 33⅓ per cent in finishing costs.

H. W. BUTTERWORTH & SONS CO.
Established 1820
PHILADELPHIA, PA.
SOUTHERN REPRESENTATIVE
Milton G. Smith, Greenville, S. C.
Masonic Temple Building

Canadian Representative
W. J. Westaway Co.
Hamilton, Ontario, Canada

Providence Office
Turk's Head
Building

BUTTERWORTH *Finishing* MACHINERY



Cut Down Waste

Where It's Most Liable to Occur In Your Dyeing and Finishing Departments

Careful, constant watch over:

Temperature of the Dye Bath
Temperature in the Bleaching Kier
Temperature in the Crabbing Machine
Temperature in the Fulling Mill
Temperature in the Carbonizer
Temperature in the Soaping Machine
Temperature in the Scouring Bowl
Temperature in the Tenter
Temperature in the Mercerizing Range
Temperature in the Drying Machine
Temperature in the Conditioning Machine

is one sure way to greatly reduce waste in your mill.

Foxboro Recording Thermometers, installed throughout your dyeing and finishing departments, make possible savings that quickly mount to thousands of dollars.

The clean, accurate Foxboro records enable you to use temperature as carefully as you use valuable raw materials.

Foxboro Recording Thermometers are built to give dependable textile mill service for years to come. They are designed by engineers who know textile processes.

Write us for Bulletin AS-104-1 giving complete information.

THE FOXBORO CO., Inc.

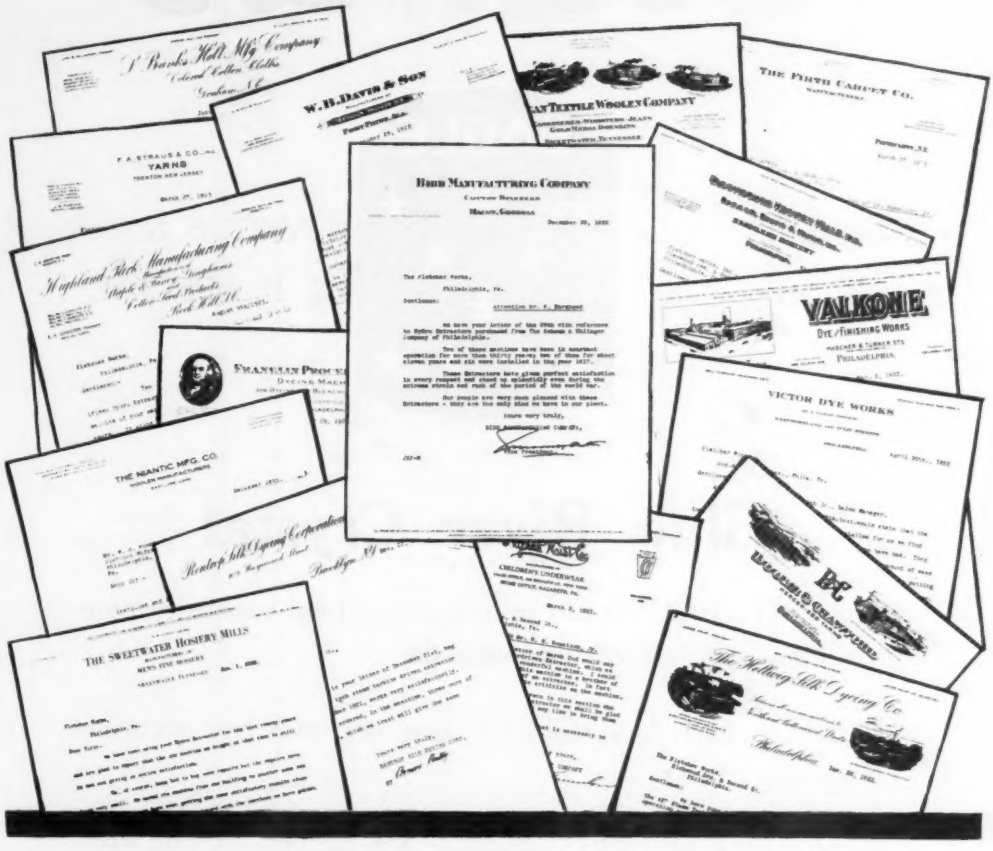
FOXBORO, MASS. U. S. A.

New York Chicago Cleveland Boston Rochester Philadelphia Tulsa Pittsburgh
Los Angeles San Francisco Portland, Ore.
Birmingham, Brown-Marx Bldg.
Peacock Brothers, Limited, Montreal, Canada.

FOXBORO
TRADE MARK
THE COMPASS OF INDUSTRY

5615

The Evidence



PAST performance is the most valid evidence of merit. From textile mills the country over we have word that FLETCHER EXTRACTORS are meeting every test of economy, speed, efficiency and durability.

The evidence of the manufacturer who has used FLETCHER EXTRACTORS is stronger than the most extravagant claims we might make for ourselves.

The technical evidence we have compiled in an illustrated circular. Won't you write us for your copy?

FLETCHER WORKS

(Formerly SCHAUM & UHLINGER)

Glenwood Avenue at Second Street **PHILADELPHIA, PA.**

Chicago, Ill.
Boston, Mass.
Charlotte, N. C.

Portland, Ore.
Los Angeles, Cal.
San Francisco, Cal.

Starch

400 MILL
500 MILL

FAMOUS N
C. P. SPECIAL

Blue River Crystal

These STARCHES are manufactured by carefully controlled and standardized methods.

PURITY and UNIFORITY are secured by accurate laboratory tests.

ECONOMY and EFFICIENCY are proven by the constantly increasing number of exacting cotton manufacturers who are getting satisfactory results by using our STARCHES especially selected for their conditions.

Recommendations are based upon intelligent investigation of each individual problem.

Corn Products Refining Company

New York

Southern Office *Greenville, S. C.*

Starch

Why better?

"HAWK" STARCH possesses all the advantages commonly associated with a thin boiling starch—greater penetration, less shedding and stronger warps.

"HAWK" STARCH is used by progressive mills because of its ***additional*** advantages, seldom found in other thin boiling starches:

— Actual Uniformity
— Freedom from dirt, or other foreign matter.
— Strength.

Ask us to send a technical man—without obligation.

STEIN, HALL & CO., INC.
61 BROADWAY, NEW YORK.
PHILADELPHIA
PROVIDENCE
CHARLOTTE, N. C.
CHICAGO
BOSTON
TROY

Hydroxy Art Silk Coning Oil

A Specially Prepared Oil

Used in the Coning, Winding, and Knitting of Artificial Silk

Makes Artificial Silk Knit Smoothly.
Eliminates Breakdowns. Reduces Seconds.
Washes out easily at low temperature.

Therefore—
Dyeing and Bleaching is even and shades brighter.

Sample sent on request—no charge.

Developene (There Is no "Just as Good")

Makes a rusty Black stocking turn deep Black.

Kali Chlorine Neutralizer

An Anti-chlor—prevents tender bleached goods.

All chemicals for the Dye House—
All oils—Sulphonated—Turkey Red—
Neatsfoot, Olive, etc.

KALI MANUFACTURING CO.

1410 No. Front St., Philadelphia, Pa.

Sole Manufacturers of "Hydroxy Oils" Patented.

MATHIESON Chemicals

A Labor-Saving Suggestion

LABOR shortage problems are daily becoming more serious; any means of labor saving must be of immediate interest to manufacturers in every part of the country.

The use of Mathieson Liquid Caustic Soda has enabled many consumers to reduce their labor cost materially; it eliminates the handling of many drums and the dissolving of the solid caustic. The labor of only one man over a short period of time is required for the unloading of the tank car and the distribution of the liquid caustic to any point in your plant.

Mathieson Solid Caustic Soda in this liquid solution contains a minimum of 97% sodium hydroxide and is the purest form in which caustic soda can be obtained. Our Technical Service Department will gladly demonstrate the savings made possible by its use.

You are cordially invited to visit us in our booths 206-207-208 at the Ninth National Exposition of Chemical Industries, Grand Central Palace, New York City, Sept. 17th-22nd.

The MATHIESON ALKALI WORKS Inc.
25 WEST 43rd STREET NEW YORK CITY

PHILADELPHIA
PROVIDENCE

CHICAGO
CHARLOTTE

EAGLE THISTLE PRODUCTS

Deal Direct with the Manufacturer

Bicarbonate of Soda
Liquid Chlorine-Caustic Soda
Sesquicarbonate of Soda
Bleaching Powder-Soda Ash

WHAT WILL THE DYE DO ?

In the Dyeing of Fine Hosiery—

NATIONAL Developed Blacks yield a shade that is full, rich and bloomy—one that has a definite quality appearance which increases the salability of your hosiery.

National Diazine Black V
National Diazine Black H Extra
National Diazine Black D R

are equally effective on plain cotton, on mercerized cotton mixed with silk, and on silk hosiery. They may be applied to either yarn or stocking.

Ask the "National" salesman what National Developed Blacks will do for your hosiery.

National Aniline and Chemical Co., Inc.
40 Rector Street, New York, N. Y.

Boston	*Philadelphia*	*San Francisco*
Providence	*Charlotte*	*Toronto*
Hartford	*Chicago*	*Montreal*

"NATIONAL" DYES

FOR TEXTILES

NATIONAL U.S.A. DYES

COTTON

Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor. **R. W. PHILIP, Associate Editor.**

Editorial and Advertising Departments, Grant Building, Atlanta, Ga. Subscription price, $1.00 per year; Canada, $1.50 a year; Foreign, $2.00 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The name of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, notify us, not the postmaster. Always give the old address as well as the new one.

Volume 87 **Member Associated Business Papers, Inc.** **Member Audit Bureau of Circulation.** **Number 11**

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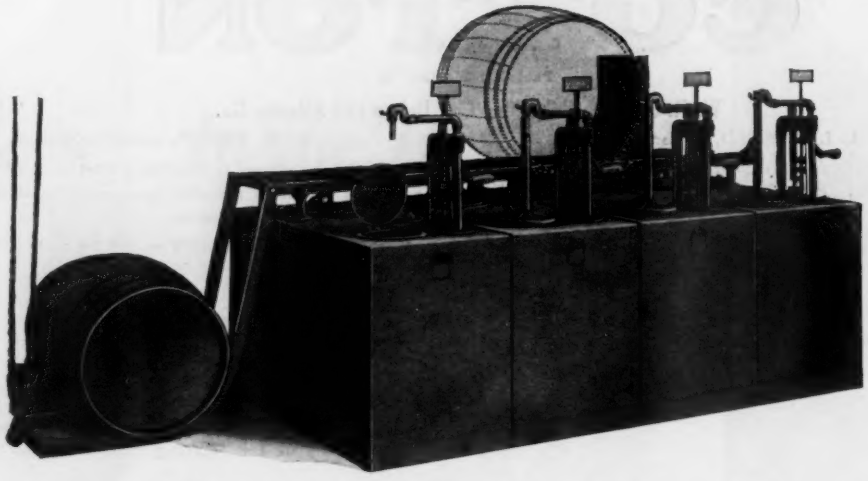


Cut 12. First Floor Battery Outfit with Single Acting, Quart Measuring Pumps.

How to Increase Earnings

One way is to increase the business—another way, one that every efficient plant is trying to accomplish, is to *decrease expenses.*

Mills, factories and machine operators are just beginning to realize the big saving that can be made in the *proper handling* of their oil supplies.

Over 10 per cent has been wasted through dripping, spilling, leakage, deterioration and failure to completely drain barrels. The time of help and machines has been lost because of inconvenience in handling the oil. The insurance rate has been higher and a very material saving has been lost by not buying in bulk.

American Lubricating Oil Storage Systems

prevent every one of these wastes and losses and gives you *better, cleaner* oil. The saving *pays for the equipment* in a short time.

A battery can be furnished of just the number of tanks you require. Each tank is fitted with a measuring pump having an anti-drip nozzle, giving exact quantities wanted without waste.

The material and construction of these outfits are of the highest order and fully guaranteed.

Write us for Bulletin No. 203 and let us figure on a system exactly suited to your requirements.

Cut 90 Outfit Pump with Meter Attached

A clean, convenient manner for delivering oil into containers in exact quantities. Fitted with door and lock on both pump and cabinet. Capacity one barrel. A safe and sanitary method of handling oils in the different departments throughout the plant.

Ask For Bulletin No. 44

The American Oil Pump & Tank Company

1179 FINDLAY STREET, CINCINNATI, OHIO

Quotations Furnished on Special Oil Tanks for Holding Any Quantity From 100 Gallons to Car Load

With the Publishers—

A Slow Motion Movie of Your Business

"That slow motion picture is a wonderful thing," remarked a mill superintendent.

He had been absorbed a few moments before in a film which showed the roving on a fly frame breaking because of too little humidity, and then jumping across to the next spindle through the attraction of static, thus making the strand on that spindle too heavy. Even the individual surface fibers could be seen bristling angrily under these adverse conditions. While the picture was made with the machine at full speed, yet on the screen the break and its succeeding events came so slowly that each detail could be distinguished. Because the pictures appeared before him eight times slower than the ordinary film he saw every action of the fibers in a manner impossible to visualize in any other way.

If this mill man had stopped to think about it he has a slow motion film of the industry every month. It is COTTON.

Consider for a moment the similarity of what COTTON is doing for its readers and the results of the delayed-action movie.

For instance, a superintendent has heard that certain mills have been setting a new productive pace—have been doing remarkable work. This seems quite a record to him, especially as production is not quite what he would like to have it in his own mill; he has been having a number of operating difficulties that have cut the output.

Then along comes his copy of the current issue of COTTON. In it is an article telling just how one of the pace-making mills went about getting its results. It is told in practical mill language by a practical operating executive.

This superintendent gets more than a snapshot showing a burst of speed. The cotton mill film, so to speak, is run so slowly for him that he sees every move.

Because every step is accurately pictured for him, even the organization and hang-up being given, he sees just how a winner in the production race approached obstacles and hurdled them successfully. This example of good form enables him to find the difficulty in his own case.

Or, instead of production, the picture may have been on costs, or breaking strength, or uneven work. There may be several of these word pictures, each handling a different subject or indicating a different angle of approach.

In studying motion-analysis films, as these helpful articles which COTTON provides for its subscribers might be designated, the mill man notes that the winners in the race usually have not carried the handicap of unsatisfactory equipment and materials.

They have found that the obstacles of irregular production and poor work are best surmounted by using machinery and supplies which have been "worked out" by experienced men and can go the entire course without let-up.

Such equipment and materials are analyzed and pictured in the advertising pages of COTTON. Their performances are cited as proof that they have come to the front again and again in the races for cotton mill records in quality and quantity.

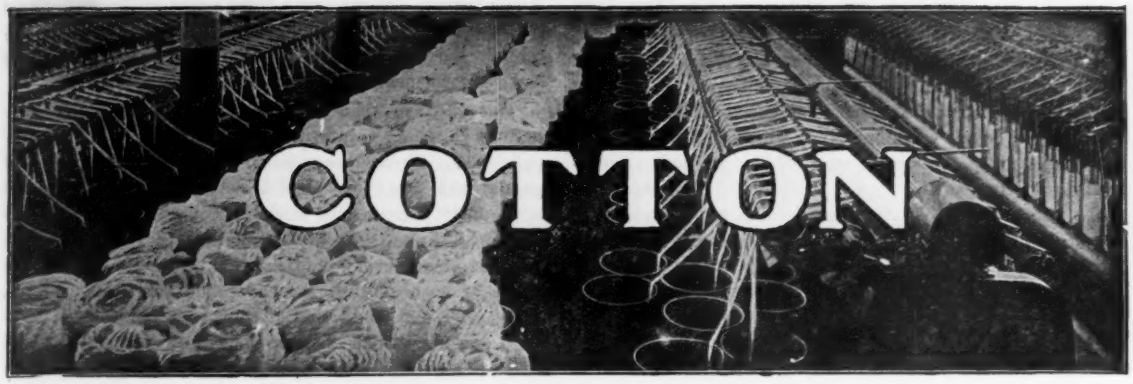
Everything looks easier and can be made easier when the mill man studies COTTON—the motion-analysis of the industry, so to speak—to learn just how other practical mill men are doing it.

AMONG COTTON'S READERS

B. L. Still, Superintendent,
Mills No. 1 and 3,
Lancaster Cotton Mills,
Lancaster, S. C.

"Having gotten so much out of articles appearing in COTTON from time to time, I want to recommend to others one of the best magazines I know—COTTON. The sayings of 'Old Timer' are worth many times the subscription price."

B. L. Still



September, Nineteen-Twenty-Three

The Wheat Debacle and Its Lessons.

Wheat prices drop to below a dollar a bushel and uneasy feeling as to American agriculture breaks into alarm. We have over 200,000,000 bushels more wheat than we need for our own use. This is 100,000,000 bushels more than we used to export. The wheat crisis, though due to many causes, arises primarily out of uncertainty as to what shall be done with surplus production. Other peoples need it, but can they buy in quantities and at prices that will indemnify the American grower? And the time approaches inevitably when other peoples won't need any large amount of American wheat—the time when Russia and the Danubian basin and the Argentine and Australia will be producing larger quantities of wheat at costs that would spell losses in America.

Therefore, all students of the subject agree that, whatever the economic justification for the recent decline in wheat prices to below cost of production, the time is near at hand when our farmers must produce less wheat.

If less wheat, why not less of farm products as a whole? Cotton alone, of the big farm staples, seems assured of continuing foreign demand sufficient to absorb any surplus production in America. Even there our own increased production costs amount to a big subsidy for an increase of cotton growing in other parts of the world.

Has the United States, as the greatest agricultural country, reached the crest as such? Henceforth, must we intentionally be predominately a manufacturing and trading nation? Is the long disconcerting trend of population from farm to city a healthful sign of a current deserving of encouragement?

These questions now are agitating the minds of many thoughtful people. Even among those in high authority there is, for the first time, a marked diversity of opinion concerning them.

For about a century, manufacturing and trade have been facilitated, by national policy, over farming. But this was done to protect ourselves as an agricultural people. Moreover, with a huge supply of virgin land permitting continuous expansion of farming operations, agriculture called for no special nursing on the part of the government.

Now the situation has changed. Free public land of any account for farming has been exhausted. New lands now opened to agriculture call for reclamation expenditures which put them on an investment basis with old land. Our farmers now must compete in foreign markets with countries that still have unlimited areas of cheap land or plenitudes of cheap labor. When the world again is normal, can our farmers meet this competition? It is very doubtful, though their better situation as to labor-saving machinery may offset some of their handicaps.

Our national Department of Agriculture seems to have reached the conclusion that the best thing that can happen to American farming is quantitative recession. Secretary Wallace very candidly says that the drift of population towards the cities is a good thing for the farmers. For to him it is apparent that our agriculture must soon depend almost wholly on domestic consumption of its products, and the more non-farming consumers there be the greater the demand for the produce of those who remain on the soil.

All others in national authority do not share this view. Among them is Dr. Hubert Work, Secretary of the Interior, whose department has most to do with carrying on projects for adding to our agricultural area.

Great sums of public funds now are being spent and larger sums are being demanded for undertakings that aim at giving the country more farms. It is difficult to find good reason for this when a vast proportion of settled agricultural lands are now not tilled at all, and most of that which is cultivated is tilled in such manner as to make the per acre yields among the lowest in the world. Because of our seemingly inexhaustible supply of cheap lands, it is notorious that much of our farming has been mere "mining" the soil—that is, the reckless wasting of the probably irreplaceable ingredients that are necessary to good production.

No doubt farming needs more constructive national attention than has been given to it in the past. But underlying that attention there should be a sound and long-distance aim. And governing that aim should be a decision as to whether we shall be a predominately agricultural nation—which, in fact, we already have ceased to be—or an industrial one, which, apparently, we have become.

While our industrial processes are among the most efficient in the world, those having to do with farming are among the least efficient. For example, for more than a century our farmers have had an all but complete monopoly on cotton production. Yet in only one other cotton producing land of consequence—India—is the production or average quality of product lower than America's. And

the same substantially is true of many other staple farm products.

There are a good many reasons for this and none of them connote lack of intelligence or enterprise among the farming population. The chief one goes back to our great quantity of cheap farming land, which it was easier to sacrifice than to develop the most efficient methods of cultivating it. In truth, economic studies would indicate that, taking them as a whole, American farmers never have profited much from mere toil. Their biggest earnings have come from increasing values of the land they cultivated. Those values, generally speaking, now have reached the point where prices of farm products, if profitable to the producer, must be gauged more by the investment worth of the farmer's plant than by the worth of his labor.

But if farmers are to be encouraged to follow the trend towards the urban counting houses and factories, what is to be done with the resultant growing surpluses of manufactured goods? The American farm still is the American manufacturer's best market. Moreover, the financial situation in which the World War left us means very probably that henceforth we must import more goods than we export. These excess imports, however, can consist, as to date, in the main of raw materials for manufacture. Even then we will have to export larger quantities of finished product.

It is a tremendously big problem. The best sign relating to it is in that, as never before in our history, many of those who have to do with it are thinking in fundamental terms. But many others are not—and among these notably are conspicuous political leaders of and spokesmen for the farmers.

If the body of American farmers can be taught to pay more attention to men who can think and less to those who can only talk their—and the greatest of—industries will fare much better in future.

The Fear and the Hope of the Politicians.

Is there to be a third political party in 1924? This, above practically all other questions, is agitating the minds of national politicians.

Of course there will be a third party next year, perhaps several. There always is or are. But will there be a real third party, like several that foreshadowed the Civil War, or like the Greenback, the Populist and Bull Moose parties of recent times? That's the important question.

Politicians view with both hope and fear the prospect of a real third party in next year's elections. Since the establishment of our government there always have been a class of public men who dreamed of rising quickly to dominant national leadership via a third or a new party. In the early days, even regular politicians made no denial of these dreams, which first were nurtured by men like John Randolph and John Quincey Adams. Even the clear-thinking Henry Clay flirted with a third party movement, the Anti-Masonic.

In more modern times only irregular politicians, the bewhiskered, disgruntled, erratic and superficial-thinking kind have confessedly been charmed by this most fascinating will-o'-the-wisp of politics. From this statement should be omitted many of the Bull Moosers of 1912. But the Bull Moose venture was scarcely a third party affair. The hope of its leaders lay in its becoming quickly a first party, through the destruction of the Republican party. In fact, it did rise momentarily to second party importance.

But even in these days third party prospects ever prompt hope and fear in the minds of the most regular of politicians. There always is a chance that one of the old parties will disappear as did the Whig, thus raising a third party permanently to first or second position as occurred in the case of the Republican party. When this happens almost every politician has to readjust his alignments or be caught by the collapse of old organizations. If he catches the new tide at the proper time he may be carried much further than he could have done by the old routes. But if he mistakes a flurry for a storm and leaps aboard some ill-fated third party vessel—and history shows that nearly all of them are ill-fated—he is done for. Bolting is about the most unforgivable sin in American politics.

The politicians greatest fear anent third parties is due to the fact that, though the Fates decree that such parties generally shall adhere to the term given them and remain of third importance, no one ever can figure out the indirect effect such movements will have on the question of which one of the old parties will be victorious.

Though no actual third party has ever captured the national government, several times has one of them named by indirection the old party which did achieve the capture. Generally they have helped the party towards which the third partyites were most opposed.

There is very little likelihood of a third party capturing the national government next year. However, on account of two United States Senators having been elected as third party candidates and of others who are virtual third party men being elected as nominal candidates of the old parties, there is some fear of that occurring. What probably will happen is the development of a third party of sufficient importance to determine, regardless of other factors, whether the next President will be a Republican or a Democrat.

This depends, somewhat, as Senator LaFollette, the strongest of prospective third party leaders, said recently on the men nominated by the old parties next year. If both of the old party candidates be of the sane and conservative type a strong third party is a virtual certainty. It is doubtful if either of the old parties can name a candidate so radical as to appease all third party sentiment.

In fact, a real third party, one so strong as to be assured of capturing actual electoral votes and electing its candidates here and there to Congress, might be the best of developments. It would tend to break up the bloc system which, if it goes on, ultimately will sap the old parties of the little affirmative vitality remaining to them, and possibly destroy our two-party system of politics. It would eliminate from the old parties such contrasts as produced by LaFollette and Smoot in the Republican, and Wheeler and Underwood in the Democratic party. It would give radicalism a chance to win in the open—if it can; and would make it impossible for radicalism to win clandestinely by the boring-from-within process. A strong third party of radical blend would be much less dangerous to the common weal than would be insincere concessions to radicalism by the old parties for the mere purpose of heading off a third party.

A Comparative Study of the Properties of Yarns of Equivalent Counts

The following discussion, prepared by the Research Department of The National Association of Cotton Manufacturers, is based on Bulletin Series 26, No. 4, of the Lowell Textile School, which contains an abstract from a thesis presented to the faculty for the degree of Bachelor of Textile Engineering by Hsueh-Chang Hsu and Tung-Chuan Wang. It was awarded the Saco-Lowell Shops prize. The summary tables showing the averages of the different tests have been included and four curves which were selected as being perhaps the most important in showing the general results of the investigation.

"The object of this thesis was a study of the properties of carded yarns of equivalent count of 5s plied in different ways. They were made by (1) spinning single 5s; (2) dry twist hawser ply yarns; (3) wet twist hawser ply yarns; (4) hawser ply yarns with varying amount of twist; and (5) cable ply yarns.

"The properties studied were: (1) Breaking strength by skein tests; (2) breaking strength by single strand tests; (3) elongation or stretch of yarn at the breaking point of the single strand; and (4) contraction of yarns in count due to different conditions of plying. Combined strands of yarn without twist were used as a basis for comparison.

"The yarns used in this investigation were multiples of 5s to 60s and plied with 0; 6; 10.62 equals (4.75√5); 15, and 20-ply twists per inch to obtain equivalent 5s. Wet twisted yarns were made only for 10.62 ply twists per inch for comparison with the dry twisted yarn of the same counts. Cabled yarns were made from 60s only because of the large number of possible combinations."

The detailed list of yarns used is shown below:

	Twisted Dry Ply Twist Per Inch				Twisted Wet T. P. I.	Cabled Yarn T. P. I.
0	6	10.62 No. 5	15	20	10.62	4.75 No. 2-6-60
2-10	2-10	2-10	2-10	2-10	2-10	6-2-60
3-15	3-15	3-15	3-15	3-15	3-15	3-4-60
4-20	4-20	4-20	4-20	4-20	4-20	4-3-60
5-25	5-25	5-25	5-25	5-25	5-25	2-2-3-60
6-30	6-30	6-30	6-30	6-30	6-30	2-3-2-60
7-35	7-35	7-35	7-35	7-35	7-35	3-2-2-60
8-40	8-40	8-40	8-40	8-40	8-40	
9-45	9-45	9-45	9-45	9-45	9-45	
10-50	10-50	10-50	10-50	10-50	10-50	
11-55	11-55	11-55	11-55	11-55	11-55	
12-60	12-60	12-60	12-60	12-60	12-60	

No. 10.62 equals 4.75 × √5.

Machine Process	Product
Card	50 grains
First Drawing	60 grains
Second Drawing	65 grains
Slubber Intermediate	.6 hank
Fine	1.78 hank, 4.0, 4.92
Jack	11.5
Spinning	
Winding	
Twisting	

ORGANIZATION PLAN.

Yarn	Feed	Draft	T. P. I.	Product
5	3 1.78	8.4	10.62	5.16
10	3 4.92	6.72	15.07	10.12
15	3 4.92	10.10	19.74	15.22
20	3 4.92	13.11	21.20	19.76
25	3 11.15	7.46	23.37	24.78
30	3 11.15	8.93	25.44	30.36
35	3 11.15	10.66	17.93	35.35
40	3 11.15	12.21	32.71	39.58
45	3 11.15	13.71	32.71	44.80
50	3 11.15	14.77	32.71	49.17
55	3 11.15	15.81	35.78	56.20
60	3 11.15	17.92	35.78	60.56

In order to compare the results of the tests, all samples were tested after they had been exposed to a relative humidity of 65 per cent at a temperature of 70 degrees F. for three hours, at which time the moisture contained in the sample and the surrounding atmosphere were essentially in equilibrium. The single strand tests were made on the Schopper pendulum type machine with 20 inches between clamps at the state of the test and with the pulling clamp moving at the rate of 12 inches per minute. The skein tests were made on the Scott pendulum type machine with the pulling clamp moving at the rate of 12 inches per minute.

From the results of the tests, the authors have drawn the following conclusions:

"(1) The strength curves of skein and single strand tests do not conform exactly to the same shape," presumably because it is practically impossible to wind a skein with all loops of a uniform diameter and because in transferring the skein from the reel to the testing machine some disarrangement of the loops is very apt to occur even in carefully regulated tests. The result of loops' varying diameters will cause the yarn forming the smaller loops to carry the load until ruptured or until the yarn has been stretched sufficiently so that the yarn forming loops of larger diameter will carry the load.

"(2) For maximum strength of ply yarns the ply twist per inch should be less than 4.75√No. By observing the points of maximum strength the twist multiplier for maximum strength appears to be approximately 3.5√No., when single yarn T. P. I. equals 4.75√No. The twist per inch corresponding to the point of maximum strength was picked up from the single strand curves, and when plotted against the yarns in the order of 2/10, 3/15.....12/60 the curve appeared to be a horizontal straight line, consequently, the arithmetic mean of them was taken and found to be 7.85 twists per inch. The values corresponding to the above yarns in the order named are: 9, 8, 7, 8, 8.5, 7.8, 5.5, 8, 9, 9, 6.5, giving a sum of 86.3 and an average of 7.85. Equating 7.85 equals M√5, therefore, M equals 3.51, or in round numbers 3.5. (For reference see curves B, plates 1 to 11, which are not shown in this condensation.)

"(3)* With a given cotton and the same relative twist the strength of a single yarn decreases as the count increases.

"(4) From the shape of the curves it appears that a change of twist in a high ply hawser laid yarn makes a greater difference in its strength than is made by the same change of twist in a low ply yarn.

"(5)* With normal amount of ply twist (multiplier equals 3.5) hawser plies made from 25s to 35s singles have the greatest strength.

"(6) When the amount of ply twist is higher than 15 twists per inch, the strength of hawser ply yarns decreases noticeably as the count of the component singles increases.

"(7) The effects of wet twisting are found to be:

(a) Increase in strength and smoothness and

(b) Decrease in stretch and contraction.

"Comparing the strength curves of single strand on

* Modifications made in the discussion.

plates 14 and 15, the wet twisted yarns show an average increase of 80 grams in strength over the dry twisted yarns; this amounts to 5 per cent increase in strength. This increase is, perhaps, due to the fact that when the fibers are wetted they swell up and become softer and, therefore, interlock with each other more firmly. It can be noticed when holding a wet twisted yarn against the light the surface is less fuzzy than the dry twisted yarn. Some of the projecting ends are held down with the rest or interlocked with each other, thereby sharing some of the strength. By measuring the diameter of two yarns of the same ply, one twisted wet the other dry, on a Randall & Stickney paper gauge the diameter of wet twisted yarn of 6/30s was found to be .016 inches (an average of 14 readings) and for the dry twisted yarn of 6/30s .01536 inches, an increase of 4.2 per cent increase in diameter for the wet twisted yarn. By comparing the elongation and contraction curves on plates 14 and 15 the decreasing condition can be noticed. The decrease in elongation is because in wet twisted yarns the fibers are held in a more compact mass and some of the crimp of individual fiber has already been taken out, therefore, the final elongation is less. Since elongation has to do with contraction and vice versa, the contraction is, therefore, less for the wet twisted yarn. †

"(8) There is no gain in strength by making hawser ply yarns from finer singles commercially.

"(9) The stretch of ply yarns under tension increases with the amount of ply twists.

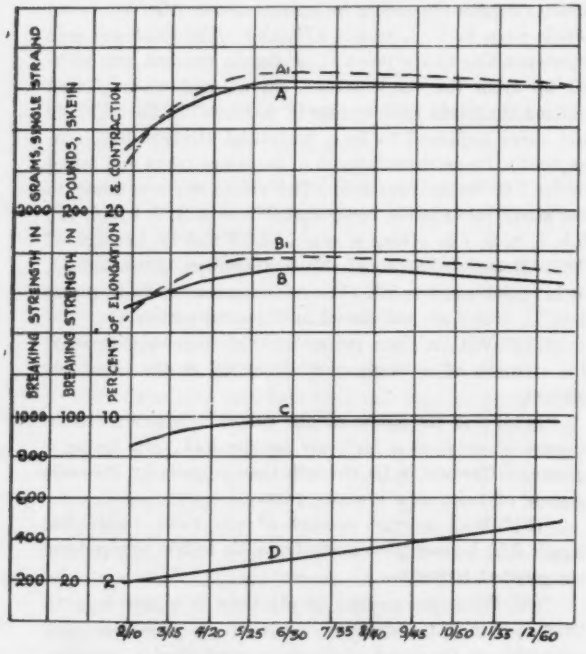
"(10) The rate of increase of stretch due to ply twist becomes faster as the component singles become finer.

"(11) With the same amount of ply twist the stretch of hawser plies increases to a maximum point and then decreases as the count of the singles becomes finer, but the change is slight when the ply twist is normal.

"(12) As the ply twist increases, the point of maximum stretch shifts towards the ply yarns of finer component singles.

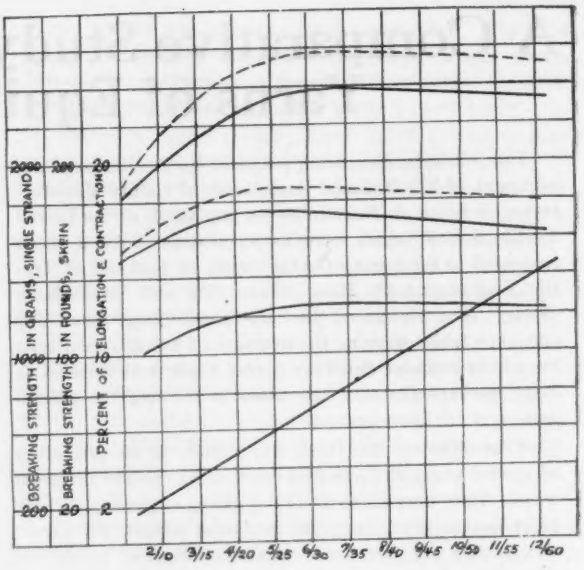
"(13) The contraction in count due to plying of hawser

† Author presumably is referring to the spirality of the fiber.



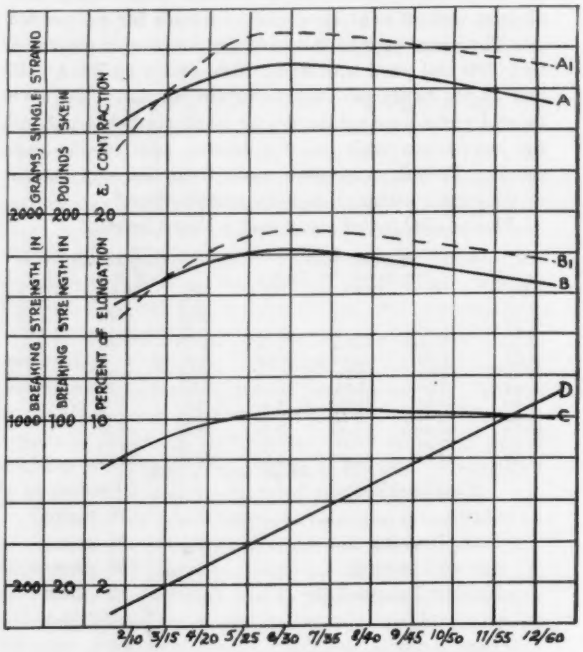
6-PLY TWIST PER INCH—PLATE 13.

A = Breaking Strength Curve, Corrected to No. 5's Yarn — Skein.
A¹ = " " " not " " " " — Skein
B = " " " " " " " — S'gle Str'd
B¹ = " " " not " " " — S'gle Str'd
C = Percent Elongation at Breaking
D = Percent Contraction in Plying


BREAKING STRENGTH IN GRAMS, SINGLE STRAND
BREAKING STRENGTH IN POUNDS, SKEIN
PERCENT OF ELONGATION & CONTRACTION
2000 200 20
1000 100 10
200 20 2
2/10 3/15 4/20 5/25 6/30 7/35 8/40 9/45 10/50 11/55 12/60

15-PLY TWIST PER INCH—PLATE 14.

A = Breaking Strength Curve, Corrected to No. 5's Yarn — Skein.
A¹ = " " " not " " " " — Skein
B = " " " " " " " — S'gle Str'd
B¹ = " " " not " " " — S'gle Str'd
C = Percent Elongation at Breaking
D = Percent Contraction in Plying



10.62-PLY TWIST PER INCH—TWISTED WET—PLATE 15.

A = Breaking Strength Curve, Corrected to No. 5's Yarn — Skein.
A¹ = " " " not " " " " — Skein
B = " " " " " " " — S'gle Str'd
B¹ = " " " not " " " — S'gle Str'd
C = Percent Elongation at Breaking
D = Percent Contraction in Plying

yarns increases as the number of the component singles increases. The rate of increase is more pronounced as the amount of ply twist is increased.

"(14) The contraction in count of ply yarns increases with the amount of ply twist inserted.

"(15) The cable yarns are stronger than the hawser ply yarns twisted dry."

SUMMARY SHEET

a = Single strand strength in grams.
b = Per cent of elongation.
c = 60 yards skein strength in pounds.
d = Weight per skein.
e = Count of skein.
f = Per cent of contraction.
(Zero ply twist yarn as standard.)
W = Ply yarn twisted wet.

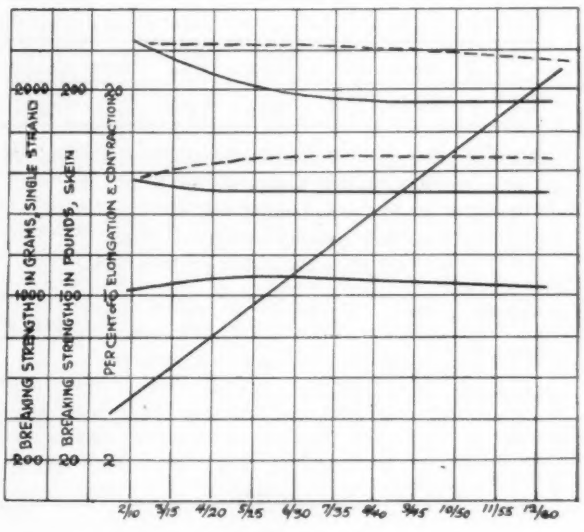
Kind of Yarn		Ply 0	Twist 6	Twist 10.62	Per 15	Inch 20	10.62 W
5s	a			1479			
	b			10.16			
	c			178.4			
	d			102.38			
	e			4.89			
	f			.....			
2-10s	a	1400	1496	1722	1540	1672	1544
	b	8.36	8.66	10.4	9.12	12.68	8.56
	c	198.4	223.2	227.8	222.5	222.2	238.2
	d	96.62	96.2	99.56	100.18	107.2	96.14
	e	5.17	5.2	5.02	4.99	4.66	5.2
	f	.....	.....	1.9	2.56	7.6	.....
3-15s	a	1262	1608	1688	1594	1574	1702
	b	8.24	9.2	10.86	10.86	13	9.36
	c	184	249.6	226.8	222.6	222.4	256
	d	102.9	104.38	108.96	110.24	117.48	106.44
	e	5.13	4.97	4.94	4.76	4.7	5.02
	f	.....	3.32	3.97	7.6	9.0	2.25
4-20s	a	1104	1686	1712	1624	1570	1842
	b	8.68	9.68	11.84	11.62	15.52	10.16
	c	169.8	224.8	223.2	218.8	199.8	276.4
	hd	102.9	104.38	108.96	110.24	117.48	106.44
	e	4.86	4.79	4.59	4.54	4.44	4.7
	f	.....	1.44	5.9	7.14	14.1	3.44
5-25s	a	1320	1834	1868	1676	1558	2040
	b	8.66	9.56	12.76	11.26	18.86	10.52
	c	192.6	269	268.8	232.6	186.6	315.4
	d	101.28	105.02	106.96	112.02	121.2	105.46
	e	4.94	4.76	4.67	4.46	4.13	4.74
	f	.....	3.66	5.57	10.56	19.6	4.1
6-30s	a	1372	1722	1868	1730	1586	1916
	b	8.02	9.58	12.34	10.36	19.3	10.9
	c	187.2	274	262.2	214.8	205.8	284.4
	d	102.32	102.78	107.94	115.48	125.3	107.34
	e	4.89	4.86	4.64	4.33	4.0	4.66
	f	.....	.47	5.46	12.8	22.5	4.81
7-35s	a	1004	1804	1854	1564	1536	1826
	b	7.96	9.92	12.78	11.28	13.98	9.4
	c	166	262	251.2	222.4	177.6	282.8
	d	98.82	102.56	106.36	110.4	121.1	105.64
	e	5.07	4.88	4.7	4.53	4.13	4.74
	f	.....	3.88	7.63	11.7	22.6	6.94
8-40s	a	832	1776	1692	1666	1488	1888
	b	8.12	9.82	12.42	11.42	21.6	10.38
	c	141	261	239.8	211	188.2	266.6
	d	98.9	100.64	107.66	112.0	122.58	105.56
	e	5.06	4.97	4.64	4.46	4.08	4.74
	f	.....	1.76	8.88	13.26	23.9	8.75
9-45s	a	1078	1718	1804	1666	1442	1904
	b	7.46	8.98	11.74	9.68	16.4	9.18
	c	149	269.6	253.8	223.4	182.8	285.2
	d	97.0	101.38	109.0	111.7	121.6	103.9
	e	5.15	4.94	4.59	4.47	4.12	4.31
	f	.....	4.51	12.4	15.15	15.4	7.12
10-50s	a	980	1670	1910	1660	1444	1884
	b	7.36	9.82	12.72	10.8	21.1	10.8
	c	149	279.6	256.2	223.8	187	287.2
	d	100.52	104.98	111.44	115.88	122.76	109.62
	e	4.98	4.76	4.48	4.31	4.08	4.57
	f	.....	4.43	10.87	15.3	22.2	9.05
11-55s	a	790	1680	1838	1764	1414	1800
	b	7.74	9.08	11.76	11.2	21.38	9.92
	c	125.2	257.2	260	222.2	183.6	277.2
	d	95.96	98.92	108.56	114.46	120.34	105.84
	e	5.24	5.01	4.61	4.37	4.16	4.73
	f	.....	3.08	13.2	19.3	25.6	10.2
12-60s	a	800	1794	1760	1710	1306	1838
	b	7.56	10.08	12.66	9.1	16.72	9.9
	c	115.2	254.4	246	209.2	160.8	265.8
	d	96.8	102.7	109.98	115.72	124.62	107.06
	e	5.16	4.87	4.55	4.32	4.02	4.67
	f	.....	6.1	13.6	19.5	28.7	10.6

The four curves shown have been selected from the seventeen curves presented by the authors.

SUMMARY SHEET

a = Single strand strength in grams.
b = Per cent of elongation.
c = 60 yards skein strength in pounds.
d = Weight per skein.
e = Count of skein.
f = Per cent of contraction.
(Zero ply twist yarn as standard.)
W = Ply yarn twisted wet.

Kind of Yarn		Ply 0	Twist 6	Twist 10.62	Per 15	Inch 20	10.62 W
2-2-3-60s	a			1802			
	b			11.54			
	c			257.6			
	d			106.8			
	e			4.68			
	f			10.3			
2-2-60	a			1810			
	b			9.92			
	c			261.4			
	d			106.16			
	e			4.71			
	f			9.67			
6-2-60	a			1830			
	b			10.24			
	c			269.4			
	d			106.5			
	e			4.69			
	f			10.0			
2-3-2-60s	a			1884			
	b			10.36			
	c			273.4			
	d			105.7			
	e			4.73			
	f			9.1			
4-3-60s	a			1964			
	b			11.8			
	c			265			
	d			105.9			
	e			4.72			
	f			9.4			
3-4-60s	a			1974			
	b			10.7			
	c			278			
	d			105.36			
	e			4.75			
	f			8.85			



15-PLY TWIST PER INCH—PLATE 16.

A = Breaking Strength Curve, Corrected to No. 5's Yarn — Skein.
A¹ = " " " not " " " " — Skein
B = " " " " " " " — S'gle Str'd
B¹ = " " " not " " " " — S'gle Str'd
C = Percent Elongation at Breaking
D = Percent Contraction in Plying

SUMMARY SHEET

a = Single strand strength in grams.
b = Per cent of elongation.
c = 60 yards skein strength in pounds.
d = Weight per skein.
e = Count of skein.
f = Per cent of contraction.
(Zero ply twist yarn as standard.)
W = Ply yarn twisted wet.

Kind of Yarn		Ply 0	6	Twist 10.62	Per 15	Inch 20	10.62 W
3-2-2-60s	a			2008			
	b			12.28			
	c			281.8			
	d			105.4			
	e			4.75			
	f			8.9			

SUMMARY SHEET OF BREAKING STRENGTH CORRECTED TO EQUIVALENT COUNT OF 5s YARN

W = Ply yarn twisted wet.
a = Single strand strength in grams.
b = 60yards skein strength in pounds.

Kind of Yarn		Ply 0	6	Twist 10.62	Per 15	Inch 20	10.62 W
5s	a	.....	.....	1443	.....	.....	.....
	b	.....	.....	174.4	.....	.....	.....
2-10s	a	1446	1556	1729	1537	1557	1606
	b	205	232.2	228.6	222	207.1	247.9
3-15s	a	1296	1597	1667	1517	1480	1710
	b	189	248	224.2	222	209	257
4-20s	a	1073	1616	1572	1473	1394	1732
	b	165	215.4	205	198.7	177.5	259.8
5-25s	a	1304	1745	1743	1495	1288	1934
	b	190.3	256	250.8	207.5	154.3	299
6-30s	a	1343	1674	1734	1500	1260	1787
	b	183.3	266.3	243.1	186.2	164.6	265.2
7-35s	a	1013	1761	1743	1419	1270	1730
	b	168.3	255.7	236.2	201.8	146.8	268
8-40s	a	842	1765	1570	1486	1215	1789
	b	142.7	259.2	222.4	188.2	153.6	278.6
9-45s	a	1111	1697	1656	1489	1188	1831
	b	153.5	266.4	233	299.7	150.6	274.5
10-50s	a	977	1590	1712	1509	1179	1721
	b	148.5	266.1	229.8	200	152.6	262.5
11-55s	a	828	1633	1694	1542	1176	1704
	b	131.2	257.8	249.5	194.4	152.7	262.5
12-60s	a	826	1747	1600	1478	1050	1715
	b	120	247.8	223.9	180.9	129.3	243.4

SUMMARY SHEET OF BREAKING STRENGTH CORRECTED TO EQUIVALENT COUNT OF 5s YARN

W = Ply yarn twisted wet.
a = Single strand strength in grams.
b = 60 yards skein strength in pounds.

Kind of Yarn		Ply 0	6	Twist 10.62	Per 15	Inch 20	10.62 W
2-2-3-60	a			1685			
	b			241			
2-6-60	a			1704			
	b			246.2			
6-2-60	a			1716			
	b			252.8			
2-3-2-60	a			1783			
	b			258.8			
4-3-60	a			1854			
	b			250.2			
3-4-60	a			1875			
	b			264			
3-2-2-60	a			1908			
	b			267.8			

Compounding the Interest on Saved Minutes.

We are reminded by the figures of savings bank resources widely advertised at this period of the year, of what can be accomplished by the slow but regular setting aside of "bits" of income. Those huge resources do not represent brilliant spurts of effort, nor strokes of genius nor any unusual happenings. They were not set up by men and women who promised themselves that they would begin saving when some happy event came or a longed-for goal was reached.

As we look at these savings figures, it is not the result that should interest us so much as the method. These great savings accumulations were built through system and regularity—qualities that bring equally telling results in other fields.

Is there not here a suggestion of the value of time-saving accumulations? Just as there is likely to be something wrong with the man who cannot save a "bit" of his income, is there not probably something wrong with the man who never has any time but for the immediate details of the day, no time to visualize the future, no time to reflect on what is happening for better or worse in his business? Everyone promises himself that he will some day have the time; but the man who does not so arrange his day that some of it shall be dedicated religiously to business study or self-study, with a view to strengthening methods and policies, will soon find himself in a treadmill whose operation becomes more and more irksome and finally hideous.

In the interests of a better organized day, let us set the time clock on ourselves and see what sort of a story it tells, and learn how we can best carve out those minutes that may be worth more to us in a few years than hard coin in the bank.

The foregoing comments for credit men by W. W. Orr, editor of *The Credit Monthly*, have a direct application to those men who complain that they have no time to read the business journals pertaining to their life work. Such reading pays compound interest on the time so used.

U. S. Ball Bearing Manufacturing Co., 4535 Palmer St., Chicago, Illinois, have issued a new price list effective July 1st, covering single and double-row radial bearings, adapter type radial bearings, angular contact bearings and thrust bearings; in all, there are 27 types listed.

The 1923 edition of the Year Book and Cotton Manufacturers Manual of the National Association of Cotton Manufacturers has been issued. This is the sixth volume in the series and the increased size and added statistical and other data indicates energetic work on the part of Secretary Meserve and his assistants. This edition contains a compilation of fundamental statistics relating to cotton and cotton manufacturing not found in other sources.

Four additional booklets in the series of instruction booklets being issued by Crompton & Knowles Loom Works, Worcester, Mass., have been distributed. These cover the center filling stop motion No. 8, silk type; the center filling stop motion No. 9, worsted type; the multiple wire filling detector; and the four chain multiplier, with a separate booklet for each subject covered.

The Frog and the Farmer

The Fourth Modern Fable

NOT BY AESOP.

Science records the instance of a small, tailless, amphibious animal of the genue Rana, who finding itself immersed accidentally in a concentrated solution of hydrogen dioxide at the bottom of a deep excavation, discovered, in endeavoring to extricate itself, that with every upward impulse it experienced a double retrogression.

All of which means that there was a frog down a well. No doubt you have heard of this.

Every time he jumped up a foot he slid back two. When the teacher told little Johnnie he would have to figure out how many jumps it would take the frog to get out of the well before he could go home, Johnnie stated promptly that he and the frog were both in the middle of a bad fix. Then, being of an inquiring disposition, he wanted to know how the frog ever got there anyhow, but the teacher said he didn't know and not to take up time talking, but to work the frog out.

Now there is no doubt that with the frog in such deep trouble the practical thing would be to get him out first and inquire into causes afterward, but as Johnnie will have him out in a few minutes, let us consider calmly and in the interests of science just how this happened, for it is not to be considered that any reasonable or right thinking frog would voluntarily and of his own accord hop *kersplosh* into such an uncomfortable predicament. The truth of the matter is that the farmer who owned the place, being a large, clumsy, careless, fumble-footed pachycephalous brute, came along and accidentally, it is true, but none the less effectively, kicked him in.

Froggie saw it coming. So did all his friends. They were amusing themselves, happily, hoppily, froggily where the ground was damp and puddly when plosh, plosh, plop! came the farmer and there was a general scattering. "Hi!" chirped froggie, "lookout!" And his companions joined in a chorus of "Better go round!" but the farmer came right on and down went Froggie to a bass cleft cacophony of "You're ruint! You're ruint!" to which Froggie wetly replied, "Me weep," for which we can hardly blame him.

"Drat!" said the farmer, peering down the hole, "there's that darn frog again. If he ever gets out this time I'm going to throw him over the fence on somebody else's farm. I don't want him around this place any more."

Still, after a few minutes of intensive figuring, Johnnie had him out in just exactly so many jumps and a wiggle, and when the teacher asked him how he did it, explained that he had turned the frog around and let him jump the other way so that eventually he had slid out over the top. Teacher wouldn't allow that—said it was against nature, so Johnnie had to try again.

Why all this frog stuff in a technical magazine?

Overlooking all jokes to the effect that it is naturally a deep subject, and in the effort to point a moral if not to adorn a tail—the frog having lost his—let us look at it this way. We will let the farm represent any manufacturing establishment, say, yours. The frog will be the superintendent, overseer or whoever is supposed to see to the proper running of things. Somewhere about your plant there is a well. Perhaps it is little known, all but hidden by the dust of disuse, but it is there and some day if you are not careful one of your men will fall into it, possibly through his own carelessness, but as often as not through *yours*, and you will be fortunate if *you* do not fall with him, Mr. Farmer-President-Agent-Superintendent, or whoever you are, who has the first responsibility and the final judgment in all things. This well is the deep, steep, slippery well of inefficiency.

For it is to you, Mr. Farmer-manager that this foolish fable is addressed and it is at you that this little lecture is about to be delivered. We have all heard what you have had to say about *us*, many times. We have listened inyour office, outwardly respectful, but inwardly in a condition to shock the recording angel. We have read it in magazines and heard it in speeches until we can shout "carelessness, negligence, indifference, incompetence, inattention, stupidity, laziness and general cussed worthlessness" almost as well as you, and now suppose you sit still for a while and listen to a frog who, from a safe if somewhat submerged position, presumes to discuss the matter from his own point of view.

We will grant that we are all that you say we are. We are but human and, therefore, need the proper leadership. Do we get it from you? Leadership? Think again!

Let us consider your plant—our plant. Do your men say "Our mill" or "This damn place"? Ponder that a while!

Let us begin with the village. The old question as to which makes the town, the houses or the people is answered here. It is the houses. Take a good look at them. Would you live in one of them? If you did, would you feel any particular loyalty to the mill that furnished you such accommodations? Admitting that old man Jones, who would prefer floors not too susceptible to the influence of tobacco juice and who has lost track of the exact size of his family because he never did learn to count beyond eleven, could not take proper care of quite as fine a house as yours, you will agree that he is at least entitled to a clean and healthy location. Also that he and every other worker, no matter how humble his capacity, is entitled to a water-tight roof. Do you ever go around rainy days to see what your benificence has accorded him?

Do you ever complain to yourself and possibly to everybody else within hollering distance that all the good reliable hands are gone and left nothing in their places but scrubs? Take another good look over your village and possibly you will find the answer. More than likely you will, for, take a frog's word for it, folks are just as good as they ever were. Human nature will not change appreciably in your short span. Therefore, they have certainly gone somewhere. And the exodus is not hard to explain.

Now let us go down to your mill! In it you see reflected—for better or for worse—a personality; your own. How often have we asked ourselves what manner of man

we are, how often wondered how we would measure up on the great scale of humanity, and yet how easy it is for you to know. Go look at your mill!

"But," you say, "these blinkin' bohunks, they keep the place in a mess. How the blankety blink blooey can you expect to do anything with such trash?" Look yourself in the eye, now. There are men who do. How do they manage it? There are mills which are spotlessly clean, filled with industrious and contented workers, orderly, efficient and eminently successful. And they are nothing more than reflections of rare personalities. Are you one of them? Possibly you are or you would not be reading this. Perhaps not, but we are willing to give you all the allowance for human frailty that we claim for ourselves. The question is, whether you ever have the good sense to admit your short comings—in which case your men will probably laugh at you to your face and love you behind your back—or whether you are another consummate exponent of the great game of passing the buck—in which case your men will probably preserve a respectful attitude to your face but will be strangely affected with itching feet and swinging legs as soon as your back is turned.

Let us go back to your office. Here comes one of your men—a frog. "Mr. Manager," he says, "I am getting in a tight place and I want your advice." How do you treat him? Do you listen to his troubles and help him? Is his trouble his fault or is it yours, due to your not furnishing him with proper material, machinery or help? Now that he is near the top of the well, are you going to help him get away or are you going to kick him in? Does he leave your office feeling that he has your support and cooperation or are you one of the kind that takes advantage of the opportunity to make him think he is not much good, anyhow, or he wouldn't have gotten into any such fix, with the idea that if you keep him thinking he is about to lose his job he will maybe work that much harder? After he flops in, do you help him out? Do you yell, "Atta boy, Froggie," and lower a bucket? Do you ever, perchance, slap him on the back and say, "Well done, thou good and faithful factory bohunk," or are you afraid that he will find out that he is a good man and ask for more money, or get familiar or expect you to treat him like a human being or something? Have you discovered yet that loyalty, faithfulness and real service are things too big to be covered by any pay envelope, but will be given gladly in exchange for something that costs nothing?

Probably not, if you are the type of man this is aimed at. The chances are that when things go wrong you arrange yourself into a very business-like appearance by grabbing a bunch of old papers in one hand and a pencil in the other, and then, screwing your face into what you think is an expression of great firmness and resolution—your wife knows better if your men don't—you invade the mill. You land on everybody indiscriminately, find fault with everything, and after a general eructation all over the place, you go back to the office and say to yourself, "There, drat 'em, I've shown 'em who's boss, and I guess that's fixed." *It is.* The chances are that you have turned all your frogs around and set them to jumping the wrong way. They won't slide out over the top that way, either, any more than Johnnie's did. And if you want to find the real cause of most of the trouble you have at your plant, take a good long careful look down the well sometimes, and after everything gets good and quiet you will see—way down at the bottom—yourself.

After figuring a few minutes longer, Johnnie announced that he had better be allowed to go home right away quick, because, if nothing happened in a very few minutes, he would have that frog figured down into a place he didn't want to mention, because his mother told him not to talk rough in school.

So bear *that* in mind!

Georgia Mill Men to Meet This Month.

The second discussion meeting of the Textile Operating Executives of Georgia will be held at the Hotel Ansley, Atlanta, Ga., on Tuesday, September 18th, the session being called to order at 9:30 o'clock Tuesday morning by General Chairman R. W. Jennings, of West Point.

Slashing and weaving and twisting will be the major subjects discussed at this meeting, while bleaching, dyeing and other finishing processes will also receive consideration.

George W. Hamilton, vice-president and superintendent of the Crown Cotton Mills Dalton, Ga., is the chairman of the committee in charge of this meeting, and this committee has completed a questionnaire on the subjects to be discussed, a copy of which has been mailed to each superintendent in Georgia for reply. This questionnaire is published in the "How Other Men Manage" Department of this issue for the interest of those operating executives outside the state who might desire to discuss it.

General Chairman Jennings pointed out that the superintendents and other operating executives of mills in other states who desire to attend this meeting will be most cordially welcome to be present and take part in the discussions. "We shall be very glad to have them," he said, "and to secure the benefit of their opinions on the various subjects to be discussed." Salesmen and others representing concerns allied with the textile industry will be welcome as visitors.

The selection by the governing board of a general chairman and vice general chairman for the coming year, and the election by the organization of a member to succeed G. A. Franklin, whose term on the executive committee expires with this meeting, will be one of the business features of the convention this month.

Stuart W. Cramer, Jr., has just returned to his home in Cramerton, N. C., after attending a conference of the Joint Committee on the Standardization of Dyestuffs held in Boston. Mr. Cramer, who is a graduate of West Point, was formerly a major in the regular army, with an enviable service record across in the World War, and resigned only last year to enter into business with his father, Mr. Stuart W. Cramer, at Cramerton, N. C. Ht will become treasurer of the Cramerton Mills, Inc.

The Committee on the Standardization of Dyestuffs was appointed by the National Council of Cotton Manufacturers, and is cooperating with the dyestuff makers and the Bureau of Standards in working out a standardization program for American colors.

Of interest to Mr. Cramer's many friends in the industry is the fact that he is to be wedded this fall to Miss Julia Baxter Scott, daughter of Mr. and Mrs. John M. Scott, of Charlotte, N. C.

Iron as a Mordant for Cotton

BY WILLIAM BROADHURST.

Mordants are a class of bodies which serve to fix coloring matters upon the fiber and are represented largely by the metallic oxides. The anhydrous metallic oxides do not act on coloring matters, but the hydrated oxides combine with them forming insoluble compounds called lakes. These may be considered as salts, in which the coloring matters play the part of acids, which can be displaced by stronger acids, as will be shown further on. This affinity of coloring matters for metallic oxides has been taken advantage of for fixing many colors on cotton.

The salts, whether metallic or alkaline, act on the coloring matters sometimes by their acid and sometimes by their base, but more frequently by the latter. In the first case they brighten or change the color, while in the second their oxides combine with the coloring principles, forming insoluble precipitates. If a solution of acetate of iron or chloride of tin be added to a decoction of logwood or redwood, precipitates of various colors are produced, which are really lakes or compounds of the coloring matters with the base, while the supernatant liquors retain the liberated acids.

In most cases the presence of tissues greatly facilitates this decomposition. In such cases the lake is deposited on the tissue or fiber and fixed there, so that, to a certain extent, a dyed fabric may be considered a ternary compound of tissue, metallic oxide, and coloring matter. This is the fundamental principle of the theory of modants, a name given to salts and other substances by means of which we are able to fix coloring matters which of themselves have no affinity for the fabric. It is, however, rare for the salt to act as a mordant without undergoing decomposition; when it does it acts as a catalyst as copper salts, for instance, in cutch dyeing or vanadium in aniline black dyeing.

A variety of attributes are necessary for a good mordant. It must have a strong affinity both for the cotton fiber and for the coloring principle, and be capable of combining readily and permanently with both. Yet these affinities must not be *too* strong. If it combines too eagerly with the fiber, the result will be unevenness; those parts of the goods which first enter the dye, or which are in any way more readily acted upon, will receive more than their share and the other parts less. On the other hand, if the mordant have a much stronger affinity for the color than for the fiber, the result is that instead of depositing, a *lake*, a colored precipitate, will be formed, which subsides to the bottom of the dyebox leaving the goods very meagerly and loosely covered. Thus many metallic compounds capable of forming fine lakes with this or that coloring principle, are quite incapable of filling the part of mordants. It is essential that the mordant should combine both with the fiber and the color with regularity, and at a moderate rate, so that the compound formed may not be loosely plastered over the surface of the fiber, but penetrate into its pores. The result otherwise will be uneven, fugitive and dull in color.

Again, the mordant must, in the state in which it is used, be incapable of injuring the fiber. If it be of a corrosive character, whether from excessive acidity or alkalinity, the texture of the goods will be injured. Its action upon the color is also important. This must not be deadened, but if anything brightened by the combination with the mordant.

It is likewise desirable that a mordant should not by itself affix the color of the fiber. If it, as is the case with the salts of iron or copper, possesses any tinctorial power of its own, its use is necessarily restricted to one particular class of shades.

Mordants, as a matter of course, must be soluble, and be applied to the fiber and the color in a liquid state. But they must likewise be capable of readily becoming insoluble when the combination is effected. If they cannot be made insoluble they would, together with the color, be at once removed by a simple washing. This change from solubility to insolubility is accomplished in various ways. Sometimes it is the mere result of new combinations being formed, the mordant and color, each of them soluble by itself, form an insoluble compound when they come together. Sometimes the mordant, when brought in contact with the fiber in a dilute state, is decomposed, leaving an insoluble subsalt in combination with the fiber. Sometimes the insoluble state results from the escape of a volatile acid; thus if a piece of cotton is moistened with acetate of iron, and is then dried, the acetic acid escapes and the iron remains on the fabric as an insoluble oxide.

From this consideration it appears that such substances only are capable of acting as mordants as are in their constitution unstable, their components being only held together by a feeble affinity, readily overcome, in some cases the capillary attraction of the fabric itself being sufficient to cause their dissociation and precipitate their insoluble oxides on the goods. Highly stable permanent compounds refuse to hand over any of their constituents to the fiber. Thus copperas (sulphate of iron), a very permanent salt, is a weak mordant; but if it be converted into acetate of iron by double decomposition with acetate of lime or lead, its constituents are then held together by a feebler tie and it becomes more efficient.

Many of the most approved mordants undergo spontaneous decomposition if kept for a length of time. This is the case with "scarlet spirits" and with nitrate of iron.

Mordants are specific, not general. In other words, a substance very efficacious upon one fiber is not necessarily suitable for others; and though admirably adapted for certain coloring matters, it may be nearly useless or even mischevious for others. Thus, upon cotton certain salts of iron, i. e., the acetate and nitrate, are valuble mordants, but they are not adapted for wool. Tin is the mordant for cochineal and lac; but it is as decidedly not the mordant for madder or the alizarine colors.

In considering the adaptability of a mordant for any purpose we have to look not only to the base or metallic oxide present, but to the acid with which it is combined, and which greatly modifies its qualities or properties. An excess of acid not only injures the fiber to be dyed or printed, but it holds back the base from being deposited in sufficient quantity upon it, giving the work a meager,

starved appearance. On the other hand, if the mordant be too "dead," as it is technically styled, the base will be delivered too rapidly, and the color will be uneven and generally dull.

Some acids deliver the base most readily to wool, and others to cotton. Thus, either tin or iron dissolved in nitric acid is more readily deposited upon cotton than if hydrochloric acid were the solvent, the latter being more disposed to hand over its base to wool. Thus, if a swatch of goods composed of part wool and cotton be steeped in a solution of nitrate of iron in water the cotton will be colored buff by the oxide of the iron. If, however, it be treated with the muriate of iron instead of the nitrate, the wool is dyed but the cotton comes out almost colorless. One reason for this different action of the two salts is that the nitrate of iron is a much less stable compound than the muriate. Now, as cotton is generally dyed or mordanted in the cold, it is able to take the base from the nitric acid, though unable to overcome the more powerful affinity of the muriatic.

Wool and worsted, on the other hand, being dyed at a higher temperature, are able, with the advantage of the heat. to take the base from the muriatic acid. The matter deposited upon the fiber is in most cases not a mere oxide of iron but a subsalt containing a portion of the acid which was present.

The principal iron mordants found in the markets of commerce are: ferric nitrate ($Fe_2(NO_3)_6$; molecular weight, 483.8.

Ferric nitrate is prepared by dissolving iron in nitric acid. It is used in dyeing iron-buff and Prussian blue.

Ferric sulphate (nitrate of iron), $Fe_2(SO_4)_3$; molecular weight, 399.9.

"Nitrate of iron" consists chiefly of ferric sulphate. Some of the commercial products correspond to the formula $Fe_4(SO_4)_5(OH)_2$. It is prepared by treating copperas with nitric acid and sulphuric acid. It may be used in some cases for coarse work in place of acetate of iron.

Ferrous acetate. Iron liquor, black liquor, or pyroligenite of iron, $Fe(C_2H_3O_2)_2 + 4H_2O$. Molecular weight, 245.8.

Ferrous acetate is prepared by dissolving iron in pyroligneous acid or by the double decomposition of ferrous sulphate and crude calcium acetate. The impurities found in commercial iron liquor are ferrous and ferric sulphates, excess of acetic acid and sulphate of lime.

Ferrous acetate is extensively used as a mordant for alizarine colors, for black dyeing with logwood and in the production of iron buffs and khaki shades.

Ferrous sulphate. Copperas or green vitriol $FeSO_4 + 7H_2O$. Molecular weight, 278. The usual impurities are copper, alumina, zinc and free acid.

Ferrous sulphate is readily soluble in water, and is used as a reducing agent in indigo dyeing, in the dyeing of greys and blacks, in the fixation of tannin mordants and for the production of various iron mordants.

Copperas is generally prepared from the soft, white variety of iron pyrites frequently found to an immense extent in the coal measures. These, on exposure to air and moisture, decompose the latter, taking up oxygen, and are thus converted into sulphate of iron. Should the sulphuric acid thus generated from the mineral be more in amount than the iron is capable of saturating, a quantity of scrap iron is added to the liquid which drains from the pyrites.

In this connection I might remind the readers that iron pyrites are a bisulphide of iron.

Copperas forms pale greenish blue, semi-transparent crystals containing 45 per cent of water. If this is expelled, there remains a white powder. The crystals dissolve in one and one-half times their weight of cold, and in one-third of boiling water. On long exposure to the air they become covered with a brown rusty coating, especially if damp, owing to the formation of a portion of sesquioxide of iron.

Copperas should be well drained from the mother liquor; the crystals clean and hard, and of a decided green color. If of a dull whitish or greyish green the presence of alumina is to be suspected. To a small extent this impurity will be found in most samples, but if pyrites have been used contaminated largely with aluminiferous shales, or if the copperas has been crystallized from a too concentrated solution, it may rise to very serious proportions, and seriously impair the colors produced by the copperas.

Lime is sometimes dusted over copperas to give a newly made article that brown spotty appearance, which some consumers prefer; it is needless to say that this is a damaging adulterant.

The direct uses of copperas in dyeing have very much diminished of late years. For dyeing blacks upon wool in conjunction with logwood it has been to a very great extent superseded by chrome. For blacks upon cotton, as also for saddening, or raising, drabs, clarets, slates, etc., the neutral nitrate of iron is generally preferred. This is the ferric sulphate made from copperas, nitric acid and sulphuric acid. But the quantity of copperas consumed indirectly in dyeing and printing, as serving for the prepartion of nitrate and acetate of iron is very large. It is also used in some styles of indigo blue dyeing such as China blue, Lazulite, etc.

Under the name of "nitrate of iron" a great variety of preparations are sold, some of which contain nitric as their only acid and which should be used especially for dyeing Prussian blues; others contain both nitric and sulphuric acids in varying proportions; and others, again, a mixture of nitric, sulphuric and acetic. Some are perfect persalts of iron, such as those made from nitric acid and scrap iron (for Prussian blues), but the majority contain proto-salts to a greater or less degree. Some are made from scrap iron, some from copperas and some from a mixture of the two.

Some are prepared from pre-existing nitric acid while in others the iron is dissolved by nascent nitric acid liberated during the process by the action of sulphuric acid upon nitrate of soda. Yet so many and various are the purposes to which nitrate of iron is applied that any one of these varieties has its own place and for its own particular purpose can be pronounced of good quality.

We have, in the first place, "blue irons," such as serve for printing or dyeing blues upon silk or cotton with the aid of prussiate of potash. Blue irons should be more strongly acid than irons for other purposes and should be pure persalts; if too "dead," that is, if the amount of iron be too great in proportion to the acid, a part of the Prussian blue formed will be precipitated to the bottom of the dye bath, and that which is fixed on the goods will be dull, loose and cloudy. Nevertheless, the nitrate of iron, even for blues, must not be too raw; if so, the color will be thin

and hungry, and the goods will be damaged by the free acid.

If the article to be dyed be silk or cotton skeins, a blue iron made from copperas, and approaching very nearly to a pure persalt of iron, will give results superior to those obtained from a true nitrate, from nitric acid and scrap iron. If piece goods with a cotton warp are to be dyed, the wool or worsted having first received its proper color from one of the aniline blues, a blue iron made from copperas is not admissible, as it sometimes stains the worsted. If the shade required be a sky blue, or if it be for conversion into a green by the application of a yellow, a blue iron from hoop iron dissolved in nitric acid is advisable. But if a true royal blue is desired, of a warm, bloomy tone, the best nitrate of iron is that prepared with nitrate of soda and sulphuric acid.

Black irons, or those used for printing and dyeing black upon silk, wool or cotton, in conjunction with galls, myrobolons, logwood, or some other dyestuff containing tannin, require a different preparation. Thorough saturation of the acid is here of great importance, as raw acid tells a fearful tale, both upon the goods and the colors. Yet there must not be more iron present than can exist in a true state of solution, and delivered in a regular manner to the fabric. If this limit be overstepped, the blacks will not only be uneven and blotchy, but they will in all probability, be streaked and clouded with rust marks, where oxide of iron has been deposited upon the fibers without having combined with the tannin. Under most circumstances irons made from copperas are decidedly preferable for dyeing black to those made from the metal itself.

Neither is it essential that all the iron should be in a state of perfect peroxide. On the contrary, both theory and practice show that a fuller and bloomier black can be dyed with a nitrate of iron containing a proportion of protoxide. If the protoxide be too small in amount, the black produced will be brownish; if too large it will have too blue a tone.

In some cases a quantity of acetate of lead or lime is added to the black nitrate of iron. By this means a portion of the sulphuric acid derived from the copperas is removed, forming an insoluble sulphate with the lime or lead, which gives up acetic or pyroligneous acid to take its place.

A nice balance must likewise be preserved in irons for printing purposes. If too raw an acid, the doctors and copper cylinders of the printing machines are damaged and often to a serious extent. The finished goods, also, not being subject to a final rinsing off as in dyeing, are very apt to be corroded in holes. The greatest freedom from tendering is required when unwoven cotton warps are printed.

A third class of nitrates of iron are the "common" or "saddening" such as are used in dyeing drabs, modes, browns, etc.

These require to be rather sharper than the black qualities, so that the combination they form with the sumac, catechu, etc., may be faster and able the better to withstand subsequent treatment with alum or preparations of tin. They should, as nearly as possible, be perfect persalts of iron, and may be made either totally with copperas, or may contain a mixture of copperas and metallic iron. A preparation of iron extensively employed in some works in the place of the common acid nitrate, is a mixture of the neutral nitrate with free acetic acid; this is accomplished by adding a little acetate of lead to the solution of nitrate of iron. The acetate of lead is decomposed by any free nitric or sulphuric acid that may be present with the formation of an insoluble nitrate or sulphate of lead which is precipitated and free acetic acid which remains in the solution. This gives an absolutely neutral solution of nitrate of iron insofar as mineral acids are concerned, which is what we want, the acetic acid being subsequently driven off in the drying and the ageing. It is the opinion of the writer that sodium acetate would answer as well and would leave no precipitation.

A solution of a sub-pernitrate of iron made by adding a small quantity of an alkaline carbonate to the nitrate is also sometimes advantageously substituted for the nitrate prepared as above. The peroxide of iron which is precipitated at first may be redissolved on agitation, if only a small proportion of the alkali (soda) has been applied. If all the precipitate refuses to redissolve after a reasonable agitation the addition of a little acetic acid will clear it.

Two other forms of peroxide of iron have been occasionally used as mordants; one analogous, in its chemical constitution to basic alum and the other to red liquor. The first is prepared by partially decomposing, by means of an alkaline carbonate, the persulphate of iron made by boiling copperas in dilute nitric acid. The iron oxide at first precipitated by the alkali is slowly redissolved by the undecomposed persulphate, giving rise to the subsulphate of the peroxide.

The preparation of peroxide of iron, analogous to red liquor, may be made by adding one part, by weight, of acetate of lead, to four parts of a solution of persulphate of iron at a density of 1.65. Sulphate of lead is precipitated, and the solution comes to contain subsulphate of the peroxide of iron and peracetate of iron or free acetic acid. It is the opinion of the writer, however, that acetate of lime may be used in place of the lead in most cases, if this were done the process would be conducted much more cheaply and the precipitate would, of course, be sulphate of lime in place of lead.

Acetate of iron or black liquor. This very important mordant consists of protoxide of iron combined with and kept in solution by crude wood vinegar or pyroligneous acid. It is prepared by two distinct methods. Either scrap iron is dissolved in the free acid—generally with the aid of a gentle heat—or a solution of copperas is mixed with one of some soluble acetate, such as the acetates (pyrolignites) of lime or lead. Contrary to what might be expected, pure acid or pure soluble acetates do not produce as good a quality of black liquor as that containing a certain amount of tarry matter. Concerning the part played by this tar in dyeing, there is some diversity of opinion. Black liquor is sold at different strengths, ranging from 10 degrees to nearly 30 degrees Tw. It has an astringent taste, is an olive color, but in large quantities it appears black.

It serves for producing upon cotton a variety of shades according to its strength and the coloring matter with which it is used as a mordant. It is mostly used, however, to produce blacks, browns, greys, slates, chocolates, purples, etc., with madder and alizarine coloring matters. Khaki shades with chrome, and blacks with logwood. Acetate of iron is distinguished from the nitrate by being a protosalt and the protosalts give with logwood and alizarine and most

of the vegetable dyestuffs the most brilliant and also the most permanent colors. Iron protosalts, if exposed to the air, pass very readily into the state of persalts, especially if the salts be neutral, that is, have no more acid than is combined with the oxide.

However, where the use of a protosalt of iron is necessary, any persalt in the mordant may be reduced to the proto-state by the immersion in it (i. e., in the solution) of pieces of clean iron for a few hours previous to using it—in fact, it is always advisable to place a few pieces of hoop iron in all solutions of acetate of iron that are desired free of any peroxide; this will prevent any persalt of iron from forming.

Application.

Copperas or ferrous sulphate is applied to cotton on tannin exactly like the ferric salt. Sometimes it is used for darkening certain aniline colors which have been previously fixed with a tannin mordant. In many cases the goods are first impregnated with a hot decoction of a natural dyestuff such as logwood, fustic, bark, cutch, etc., and subsequently passed through a cold solution of copperas. Probably the commonest way of applying copperas in cotton dyeing (especially for blacks) is to prepare with tannin, pass through clear lime water, and then through copperas solution. By the double decomposition of the calcium tannate and copperas, ferrous tannate is fixed on the fiber and calcium sulphate is formed, which is subsequently removed by washing. The ferrous tannate is rapidly oxidized by the air to ferric tannate.

Copperas leaves only a very small amount of iron on the fiber by simply impregnating and ageing, hence it cannot be used alone but needs some tannin substance as above to combine with and hold it.

Black iron liquor or ferrous acetate is used in the dyeing of cotton piece goods and in calico printing and is extensively used as a mordant in the production of blacks, purples, browns, etc. Black iron liquor is applied exactly like aluminum acetate, by impregnating the fiber, drying and ageing. But there is this difference: the aluminum salt is merely fixed by the loss of the acetic acid, whereas the iron salt loses acid and is oxidized to form a ferric compound. It is essential that the iron mordant be incorporated with the fiber in a ferrous state and be slowly oxidized while the acetic acid escapes, since ferric acetate cannot be fixed and is removed by the "dunging" bath. The best results in dyeing are obtained if the iron is in a state of oxidation intermediate between ferrous and ferric oxide. An energetic and rapid oxidation, by passing through oxidizing agents, like chloride of lime or bichromate, would not yield good results. The oxidation is regulated and restrained within definite limits by adding certain oxidizable substances to the mordant. A solution of white arsenic in acetic acid to which some glycerin is added, is used for this purpose.

Black iron liquor is sometimes mixed with red liquor to obtain chocolate shades, and in this case a salt of copper is added to the fixing liquor. It is difficult to fix the mordant when printing or dyeing a mixture of iron and aluminum pyrolignite. This circumstance may be explained by the fact that red liquor (aluminum acetate) generally contains sulphates which form ferrous sulphate by double decomposition. Ferrous sulphate is a bad mordant, which leaves, on ageing, only a small amount of oxide on the fiber, while the same salt, with the addition of arsenic and a salt of copper, fixes much more.

The goods which have been mordanted with black liquor are passed, after ageing, through the "dunging" bath in the same way as those treated with red liquor; cow dung, arsenate, phosphate or silicate of soda give good results.

Nitrate of iron is the most important ferric mordant used in cotton dyeing. A basic salt which holds an intermediate position between the normal salt $Fe_2(SO_4)_3$ and the basic salt, $Fe_4(SO_4)_3(OH)_2$, is generally used. Basic ferric sulphate-nitrates of a similar composition are also frequently employed in cotton dyeing, as stated before. The material may be mordanted with this salt by simply saturating it with nitrate of iron (three to six degrees Tw.) and subsequently passing it through a weak solution of caustic soda, soda ash, lime water, or chalk. The operations are repeated until enough ferric hydroxide is deposited on the fiber. In this way cotton is dyed iron buff and blue (with prussiate).

Alkaline iron mordants. The presence of certain organic substances such as glycerin or glucose in solutions of ferric salts prevents the precipitation of the ferric hydroxides by alkalies, and thus an alkaline solution of ferric hydroxide can be prepared which readily dissociates, for instance, 20 parts nitrate of iron (70 degrees Tw.), 60 parts glycerin and 20 parts ammonia are mixed and suitably diluted. The goods are impregnated with this and exposed to the air, or dried, when the ammonia is volatilized, and insoluble ferric oxide remains in the fiber.

This process is of value in some cases, but expensive, and will not appeal to the man in the office.

A New Book on Ring Spinning.

PRACTICAL RING SPINNING, by L. J. Mills. 405 pages. 172 illustrations. Emmott & Company, 65 King Street, Manchester, England, publishers.

This is a recently published volume that should prove of helpful technical use. Ring spinning is treated fully, and the book is divided into two general sections. Part I deals more particularly with the principles of cotton yarn spinning and the construction as well as the action of ring spinning frames. Part II takes up this explanation of the mechanical construction and action of the machine and discusses the operation of the spinning frame in actual mill use, covering all phases of its operation, such as the starting up of new frames, setting of rollers, gearing calculations, speed of spindles and twist constants, travelers, bobbin building, etc., and a thorough description of all these various phases is given. The changing of counts, and the calculations necessary therefor, production calculations, defective yarn and its causes, spinning room humidity and the arrangement of frames also are fully discussed in a manner that will be of real service to managers, spinning room overseers and foremen and students. The author is a cotton mill manager, engineer and consultant, and the volume grew out of a series of articles on ring spinning that originally appeared in the *Textile Manufacturer*, the material being thoroughly revised and much new matter being added. Readers interested may secure copies through the Book Department of COTTON.

Yarn Changes in Spinning and Twisting

The Effect on the Workers Caused by Changing Counts—How to Figure a Fair Day's Work for Creelers—Questions of Policy and Other Suggestions.

BY R. A. SONIAMAN.

Men with years of practical manufacturing experience on spinning and twisting machinery realize that where a company makes a wide variety of counts and styles and does the work on divers sized rings there is always the possibility of the whole mill being upset on account of ill-advised changing.

One of these is the changing of frames adapted for only fine numbers to coarse counts and vice versa. Such a maneuver generally results in disaster—disaster for the workers as well as the company—because it places an unwarranted worry on the shoulders of the workers. In fact, in some cases an insupportable responsibility is thus thrust on the workers who cannot possibly come up to expectations. For the company there is loss of production due to ends breaking, waste percentages aeroplaning upwards, and what is not quite impossible, the attendants may take French leave.

It would be well then, for the general benefit of all concerned, for the firm to have a limitation to the sizes of rings and the speeds of spindles for the different counts and styles. Such a procedure is a matter of necessity for those places who run a great variety of counts at one time. Concerns making only a few kinds are to be looked upon as rather fortunate people by those who are approaching the 57 variety class.

A little consideration will disclose the logicality of a production manager for the latter class of mill and also the need of his being a practical man even if his experience with the actual operating of the machinery is somewhat limited. Such a man will understand the danger of running 4s on 1½-inch rings, or 150s on 3-inch rings—a procedure that would soon put the plant in a thoroughly chaotic condition.

The person responsible for the changing should also be conversant with the various numbers of spindles per frame. This condition is probably met with more in an old established plant, where a predilection for old machinery has resulted in a heterogenous assembly of machines, old and new, and of divers lengths.

Sometimes the changing can be so arranged that some of the smaller frames can handle the work, whereas, if it were put on large frames, a toboggan slide would occur in the stock on hand, necessitating a fresh change. Skillful manipulation of the long and short machines will often save a change.

Another side to the proposition of changing counts is that of making the changes so as to give each worker an equitable amount of work. Only an intimate acquaintance with the actual conditions in a room, the counts running, the disposition of same throughout the room, and the amount of creeling, doffing, lubrication, and cleaning—all these things must be known if a change is to be made in a scientific manner.

In those rooms that have a fairly uniform size of ring and number of spindles and where the counts range, say, from 50s to 110s, the counts can be so laid out that there is no cause for complaint from the workers about too much work for some and too little for others.

For example, a spinner running 8 sides, 4 frames, could have one frame 50s, one frame 75s, one frame 90s, and one frame 110s, while another spinner could have one frame 65s, one frame 85s and two frames 100s. This allocation keeps the close counts away from one another, thus tending to decrease the chances of mixtures and the creeling and doffing are more on a par.

There are times when a change in schedule is so drastic towards the coarse side and so many frames must be changed that it will be necessary to either cut down the number of sides per worker or increase the number of spare hands.

It is well, however, in all cases to determine the standard number of sides to be given a worker, based on the average counts running. The arrangement could be a sliding one, where there would be an increase in sides when finer counts than the average were run, and a decrease when coarser counts were put on the machines.

In connection with the foregoing statements, it will be shown how the creeling of different counts affects the work of an attendant. A twister may be taken for the sake of simplicity. Assume, therefore, that 70s 2-ply is being run on 1¾ rings, with the spindle speed at 6,500 rpm, the twist inserted 20 turns, the diameter of the bottom roll 1½ inches, and the speed of the bottom roll 69 rpm.

Assuming that the spools in the creel are of the 3x5 type, made on the upright spindle spooler, a type of spool which is taken on account of its inflexibility; that is, the inability of adjusting itself to various counts in the manner that the fast traverse type is capable of doing. It is the type of spool used almost universally in the twister creels up to a few years ago.

Let it be further assumed that the net weight of the yarn on a well-filled spool is about nine ounces. Calculating for yards, after changing nine ounces to a decimal equivalent of its part of a pound, .5625, we have $420 \times 70 \times .5625 = 16{,}537$ yards, a formula in which 420 is the number of two cord yards in one hank of yarn; 70, the number or counts of yarn (also the number of hanks per pound); and .5625, the decimal equivalent of the weight of yarn on the spool.

Gathering now the data:

counts twisted	70
yards per spool	16,537
turns of 1½-inch roll	69
spindles per twister	220
hours per week	50

it is necessary to find the running time of one spool to determine the creeling.

To do this the delivery of the front roll must be known.

$$\frac{3.1416 \times 1.5 \times 69}{36} = 9.03 \text{ yards per minute}$$

By omitting the turns of roll (69) from the formula, a constant is derived by means of which future computations of this sort will be greatly simplified. This constant, the reader will find on checking up, is .1309.

Testing the correctness of the constant by multiplying it by the turns of roll, 69, we find it to be 9.03 yards, exactly like the previous result.

Dividing the yards per spool by the delivery, $\frac{16,537}{9.03}$ = 1,831 minutes, the running time of one spool, and dividing the minutes per week of 50 hours by the running time of one spool, we have $\frac{3,000}{1,831} = 1.638$, which is the number of spools creeled for each spindle on the twister. Multiplying by the spindles on the frame, $1.638 \times 220 =$ approximately 360, the number of spools creeled per week.

Assuming now that 50s yarn is to take the place of the 70s, and collecting the data: counts, 50s 2-ply; spindle speed, 6,500 rpm.; diameter of bottom roll, 1½ inches; speed of bottom roll, 79 rpm.; weight of yarn on spool, 9 ounces; spindles per twister, 220, and hours per week, 50.

Using the delivery constant previously obtained and multiplying by the turns of the roll, we have $.1309 \times 79 =$ 10.34 yards per minute.

The yards per spool, using the previous formula and substituting 50 for 70, we find to be 11,812. Dividing the yardage by the delivery, we obtain 1,142 minutes; and next, dividing the minutes in a 50-hour week by the running time of the spool, we find that the creeling per spindle is 2.627 spools, and this, multiplied by the number of spindles per twister, gives a creeling of 578 spools per week.

Comparing the creeling of the two counts:

Counts	Spools Creeled
50	578
70	360

we see that there are 218 spools more to creel on the 50s than on the 70s.

Or, in other words, there is about 60.5 per cent more creeling with 50s than with 70s. Now if we have found 4 frames of 70s to be just about right for one worker to attend, the creeling will be found to be $360 \times 4 = 1,440$ spools per week. Dividing this creeling by the creeling per frame of 50s, we have $\frac{1,440}{578} = 2.491$, that is to say, as far as creeling goes, a worker on 2½ frames of 50s will have as much to do as a worker on 4 frames of 70s. Furthermore, the greasing and doffing of the 50s will usually be in the same proportion.

It will be thus seen that the changing of these or similarly proportioned counts, when the same size spools are used, is a matter to be well thought out so as to take into due consideration the procedure to be adopted in apportioning the number of sides to workers.

It should be said that in neither of the foregoing calculations for creeling has any allowance been made for stoppages.

As a guide for the allocation of counts on each set of twisters so as to equalize the creeling, a table like the one herewith comes in very handily.

RINGS, 1¾ INCHES—SPINDLE SPEED, 6,500.
50 HRS. PER WEEK—1½-IN. BOTTOM ROLL—SPINDLES, 220

Counts	Twist	Rev. of Roll	Del. of Roll in Yds. Per Minute	Yds. Per Spool	Run. Time Spool Minutes	Creeled Per Spindle	Creeled Per Twister
50	17½	79	10.34	[illegible]	1,142	2.627	578
70	20	69	9.03	[illegible]	1,831	1.638	360

When no change can be made without increasing the creeling radically, the better plan is to reduce the sides per worker; and the latter course can be greatly simplified by means of the table.

In connection with the policy of reducing sides on coarse counts, another phase of changing should be considered. This is the matter of getting on such a poor quality of yarn that the ends cannot be kept up when the frame is running at standard speed. In such a case a test should be made with different spindle speeds, selecting the highest speed consistent with a predetermined number of breakages.

It must then be borne in mind that the decrease of spindle speed will increase the twisting cost per pound of that particular count; furthermore, the production of any frames on this work will be decreased, relatively speaking. Actually, however, the writer has seen frames at a slower speed turn off a far greater production than was taken from them at standard speed when the machine was running a poor quality of yarn. When it is the policy of the firm to keep costs at a consistent point from week to week, and to keep production up to a maximum point, care must be exercised in the number of machines that are put on the low quality of work at one time.

Again, as far as cost is concerned, a different twist factor for the same count will make a difference in the cost per pound of production. To illustrate: in our example of creeling we have 20 turns of twist for 70s. Now, if the twist were to be increased to 25 turns per inch, the production (other conditions being equal) would be 20 per cent less. This matter is mentioned, as it may have some bearing on the cost allotted to the department.

The calculations for draft and twist after the machinery has once been running on any count is a comparatively simple operation. In the gearing, Fig. 1, the theoretical draft constant is 480.

This constant is obtained in the usual way by figuring the relation of the deliveries of the front and back rolls. An easy way of keeping in mind the process for the calculation for draft on spinning frames is to remember that the delivery of the front roll divided by the delivery of the back roll will give the draft. The thing to do is to put down the data in the shape of a formula.

To illustrate: the surface speed or delivery of the one-inch front roll in Fig. 1 is, for one revolution, 3.1416 inches. This is the dividend. Using the expression for finding the surface speed of the back roll for the divisor, we have the following formula:

$$\frac{3.1416 \div 25 \times (\text{draft gear}) \times 3.1416}{120 \times 100} \text{ or}$$

$$\frac{3.1416}{\frac{25 \times (\text{draft gear}) \times 3.1416}{120 \times 100}}$$

inverting and multiplying, we have

$$\frac{3.1416 \times 120 \times 100}{25 \times (\text{draft gear}) \times 3.1416} = 480, \text{ the constant}$$

It is, however, found in practice that the calculated constant, as shown, and the actual working constant will vary. This is due to the fact that the contraction due to

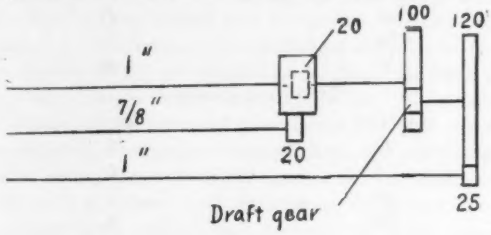


Fig. 1

the twist inserted tends to make the yarn coarser. It is necessary then to increase the draft gear a tooth or two to get the yarn the right size.

For instance, if the draft, found by dividing the spun yarn by the roving in the creel is 10, the draft gear from the calculated constant would be a 48. In practice, it will be found that, owing to the contraction, the gear required may be a 50.

Once the right draft gear is known, a practical working draft constant can be evolved by the simple procedure of multiplying the draft gear by the draft as indicated in the quotient of the spun yarn divided by the roving in the creel.

Granting that the foregoing gear, 50, is the right one for the draft found, as explained, the working draft constant would be $50 \times 10 = 500$. This draft constant would hold for those calcualtions in which the twist multiplier used remains the same. Or, to put it in another way, when the per cent of contraction remains constant.

A question often arising when changing counts is: what gear shall be put on if the result from the calculation of the draft gear from the constant shows a fraction of a tooth? The advice here given is to put on the gear whose teeth correspond to the whole number nearest the figures obtained. For example: if the figure is 50.3, try a 50 gear; if 50.8, put on a 51.

In practice, of course, the yarn is immediately sized upon starting the frame and the gear changed if the case requires. But there are times when one tooth more will decrease the size of the yarn below the standard required; whereas, one tooth less will increase the size over the standard. Some ruling, naturally, must prevail in these cases, and a definite understanding should be had as to whether it would be best to have the yarn a little heavier or a little lighter.

In the matter of twist calculation, a ply-twister will show the results better than a spinning frame, because the ply yarn can be put in a twist-counter and the actual turns inserted determined.

When a machine is running on a certain count, the practical twist constant is simply the product of the twist gear used and the twist inserted.

In the gearing, Fig. 2, the twist gear is 24. Now, if the actual twist inserted by this gear is 20 turns, the practical or working constant is 480, regardless of what any calculated constant may be. This constant will be of service in all cases where the twist multiplier remains the same.

The same reasoning that applies to over or underdrafting holds good for over or under-twisting. If a gear figures somewhere around a half tooth and the twist with a gear dropping the half tooth is higher than it should be, a gear one tooth larger could be tried and the twist taken.

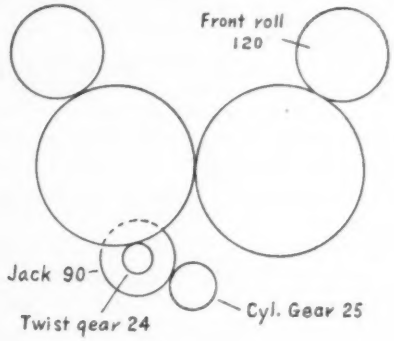


Fig. 2

Then a decision can be made as to whether it should remain over- or under-twisted. The company itself should have a definite policy in connection with this matter.

Sometimes one runs into a proposition of having to calculate the twist gear of a new frame whose gears, cylinders, spindle whirls, and so on, are entirely foreign to those on the twisters in use. In such a case, a knowledge of gearing calculations and the principles involved in the various factors affecting the gearing will be a great help.

The first thing to do in such a case is to get full data of the gearing, cylinder, and spindle whirl. A sketch of the gearing is very useful in solving the problem. Having

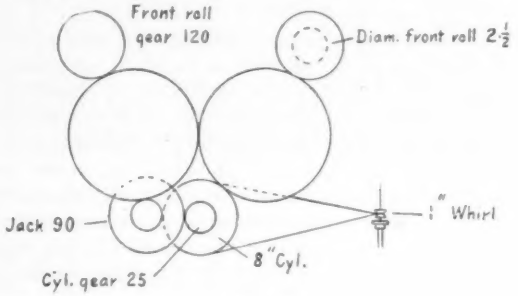


Fig. 3

obtained this data, the next thing is to find the theoretical twist constant. From Fig. 3 we note that the cylinder is 8 inches in diameter, the spindle whirl is one inch in diameter, and the front rollers 2½ inches in diameter.

An easy way of going at any twist constant calculation like that one here is to remember that

$$\frac{\text{revolution of spindles}}{\text{delivery of roll}} = \text{twist per inch.}$$

The theoretical revolutions of the spindles at one turn of cylinder would be 8. The theoretical delivery of the front rollers for one turn of cylinder per one spindle can be expressed by the formula:

$$\frac{\text{Rev. of Cyl.} \times \text{Cyl. Gear} \times \text{Twist Gear} \times 7.854}{\text{Jack Gear} \times \text{Front Roll Gear}}$$

$$\frac{1 \times 25 \times \text{(twist gear)} \times 7.854}{90 \times 120}$$

Placing these results again in the shape of a formula, in which the spindle speed is divided by the formula for deriving the delivery of the front rolls, we have—

$$\frac{\text{Spindle Speed}}{\text{Formula for front roll delivery.}} = \frac{8}{1 \times 25 \times \text{(twist gear)} \times 7.854} = 440,$$

the theoretical twist constant.

This result was brought about by the omission of the twist gear.

The next thing to do is find the per cent of band slip. This we will ascertain from a machine that is running, using a tachometer or speed indicator. We will assume again that the cylinder is 8 inches and the spindle whirl 1⅛ inches, and that the calculated ratio of spindle speed to cylinder speed is 7,110 rpm. Taking an average of the actual speed of 10 spindles we find this to be 6,541, which shows a loss of 8 per cent from the calculated speed of 7,110.

Taking the assumption that there will be at least 8 per cent of slippage in spindle speed in our example, and deducting this amount from the theoretical twist constant, the latter will now become 404.8; and if a twist of 20 turns per inch is to be inserted, the division of the constant (which is now approaching the status of a practical working constant) by the twist, will give the twist gear to be used, a 20. In practice, it will be found advisable to have 3 gears ready, one of 20 teeth, one of 19 teeth and one of 21 teeth, because the gear required may be one tooth over or under that of the figured gear.

The secret of getting the foregoing twist constant on a new frame approximately right is to get the per cent of slip correctly, or nearly so. In other words, to get the right ratio of spindle whirl to the cylinder. That it is best for the person who makes the calculations to find out for himself just what the per cent of slip actually is, becomes apparent from the perusal of the catalogs issued by the makers of spinning and twisting machinery. In catalogs of three different makers, the ratio for spindles of 1⅛-inch whirl, and 8-inch cylinder is given as in the middle column of the accompanying table:

Theoretical Ratio	Ratio in Catalogs	Per Cent Loss in Spindle Speed
7.11	6.22	12½
7.11	6.50	8½
7.11	6.75	5

One of the little efficiency aids in the changing of counts is that of a table of gears. Tables of gears may be made of twist, draft, and lay gears. The latter gears are the ones that affect the proximity of the coils to one another on the bobbins and are usually changed when there is a drastic change in counts.

Another point that may be worked up into a table is the number of teeth that the ratchet wheel is turned when building receding taper tops on twisters, or the diameter of bobbins on spinning frames.

Herewith is an illustration of a gear table—

TWIST GEARS

1¾-INCH RINGS—1⅛-INCH WHIRL—90 JACK

Counts	Gears
22	30
24	29
26	28
28	27
30	26
32	25

TEETH FOR TRAVERSE

Counts	Teeth
22	6
24	6
26	5
28	5
30	4
32	4

Another useful table is that of travelers. The travelers vary with the width of the band, the speed of the spindle and, of course, the counts and the plies of the yarn being run.

[This is the second of a series of three articles. The third and last article will appear in an early number.]

Suit has been entered by the Government against the Nashville Industrial Corporation in the Federal Court of the Middle District of Tennessee asking that the contract held by that corporation with the Government covering the sale of the Old Hickory Plant be rescinded. The Government alleges fraud in the original sale of the plant. By stipulation it was agreed that a receivership of the property would not be opposed by either side and accordingly Judge Gore, of the above court, appointed B. P. Morse, present manager of the Nashville Industrial Corporation, and W. P. Smith, assistant district attorney, joint receivers and issued instructions that the business should be carried on as usual, that sales of both realty and personalty shall be made and all activities instituted by the corporation shall continue under direction of the court.

No receivership of the Nashville Industrial Corporation was asked by the Government. Both sides have stipulated that no dilatory motions will be made and that the case shall be brought before the court for decision at the earliest date possible.

The plans of industrialization of Old Hickory will continue as it is the desire of both the Government, as expressed by First Assistant Attorney General A. T. Seymour, and the Nashville Industrial Corporation that an industrial city be made of this war expenditure. As charges have been made that there was fraud in the sale of the property, it was felt by both litigants that the question should be definitely settled in order that industrialization might proceed with absolute safety to industries intending to locate at this point.

This suit will in no way interfere with the location of the du Pont Fiber Silk Corporation as already announced. All sales contracts made by the corporation and now existing will be taken over and consummated by the Receivers, who will operate as Old Hickory Powder Plant Receivers.

There were 29,000 bales of American cotton at Bremen, Germany on July 21 against 179,000 at the same time last year.

Helping Solve the Labor Shortage

BY LARRY SPILLAN*

In a recent issue of a Chicago newspaper there appeared what seemed to me the outstanding cartoon of the year. It was one that was divided into two parts. The first part illustrated a manufacturer, with a background of busy factories, crying to the government to let down the bars to immigration that he might have more labor. The second part showed a vast army of unemployed men (the result of unrestricted immigration) over which walked a red propagandist sowing the seeds of discontent and revolution.

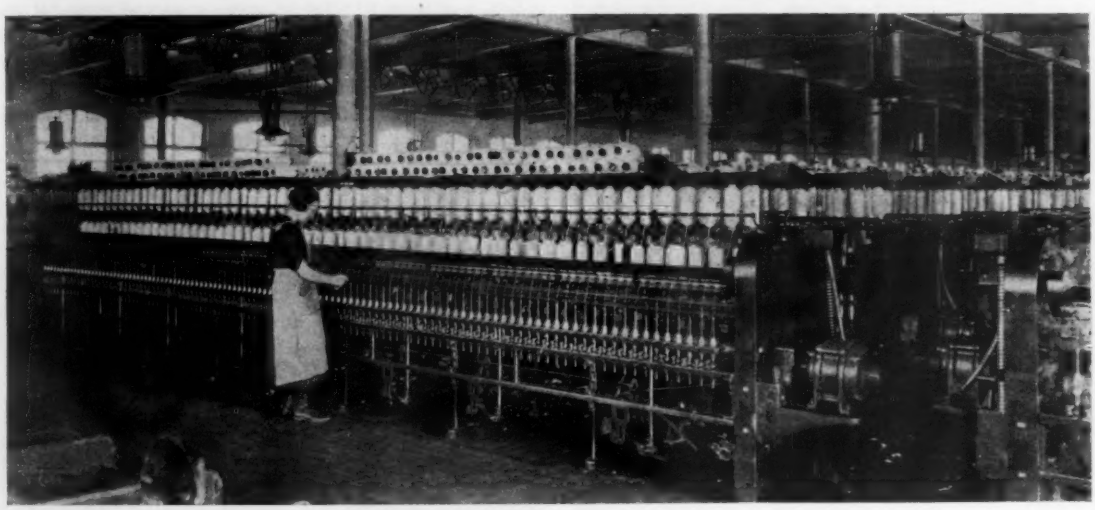
And so it is. There is all the evidence in the world that the existing labor shortage will continue for some time—if not actually grow. However, that same labor shortage may be a blessing in disguise by way of acting as a stem to the flood of communistic propaganda that is growing day by day throughout this country. An army of unemployed men can do more damage in one week, politically, socially and materially, than an acute labor shortage can in a whole year. And if you doubt that statement look to our Mother nation—England—where there are a million and a half men without gainful employment—where Labor forms a real political party, as powerful in England as the Democratic Party is in the United States and where that labor element has a recognized and important place in Parliment. Nor is the red element altogether lacking in the English Labor Party.

But all of this is aside the point. The real problem is: how can we overcome our labor shortage without letting down the bars to undesirable aliens and unassimilable foreigners who come here with one of only two objects—either to agitate the cause of bolshevism or fatten their pocketbooks. There is a way to accomplish this and the way is simple. It is merely: machines instead of men.

Nor is there any other way whereby this desired end may be attained. The automatization of industry, or the improvement on such automatization already made, is the one solution. A return to a prosperous period necessitates an increase of our productive capacity and the expansion of our distribution systems. If men are not to be had, the only way in which this can be accomplished is through the introduction of more and more machines.

Economists agitating a "perfection" in our monetary system, theoretical "salvation" in the form of new laws, or consuming the midnight oil in an endeavor to improve industrial relations seldom if ever even assists in the solving of this problem. There lies before us but one way as the solution for high wages, reduced hours, increased production or labor shortage and that solution is—machines.

It is an American characteristic to boast of our superingenuity. We heard much of what this ability was going to do for us and the world in general back in 1917. Yet the fact remains that we have hardly begun to complete the industrial application of labor saving or labor aiding machines. I find no hesitancy in saying that eighty per cent of all manufactories could save the time of from one to fifty men through the installation of better designed and more efficient machinery and equipment. And while such machinery effects a downward trend in prices (or an upward curve in profits), it does not decrease wages. Necessity, it has been said, is the mother of invention. If that be so, certain it is that the lofty wage scale and shortage of labor is the "dutch uncle" of the labor aiding machine.



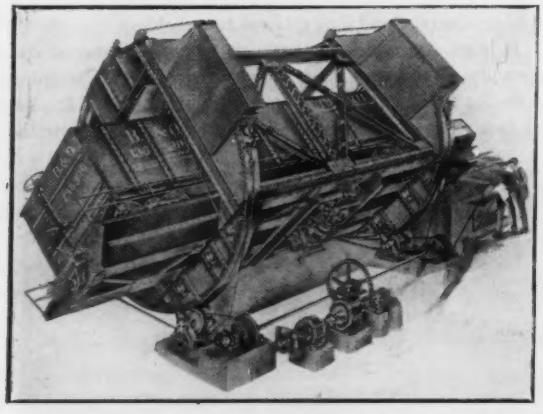
INDIVIDUAL MOTORS AND SILENT CHAIN DRIVES OPERATE THESE SPINNING FRAMES AND SHOW AN INCREASED PRODUCTION.

And it is seldom indeed that automatization fails to effect economies or reduce costs. Evidence of this is on every hand, for although our mills and factories have not installed enough mechanical substitutes, few are there that have not had some experience with bettered mechanical methods.

I have in mind a coal mine operator who, beginning immediately after the installation of a gasoline crawler crane, effected the saving of fifty men a day—and fifty men a

* Engineer, Link-Belt Company, Chicago.

day at six dollars a day each meant a very great deal to him after a period of three or four months. Certainly twice or three times the original cost of the crane. And another instance is of a manufacturer of automatic telephones installing a suspended electric motor and silent chain drive for the driving of his line shaft which operated some 28 punch presses. This one installation saved in dollars and cents of labor costs over $1,800 a year—or something like a return of 500 per cent, on his investment. Or take as an instance, a meat packer in Milwaukee who had never been able to obtain more than 900 pounds of sausage from his sausage machine, notwithstanding the guarantee of 1000 pounds per hour. His power was ample, his sausage machine was in excellent condition. But he wasn't getting the sausage. The cost to him was 100 pounds of sausage every hour and that cost, multiplied into terms of months and



A 35-H. P. MOTOR AND ONE MAN DUMP 40 CARS AN HOUR.

years compounded itself into a regular loan shark's interest item. Driven into action by the prodding thought of his loss he changed power transmission at a cost of some two hundred dollars. And ever since he has been getting full capacity from his machine whenever he wanted it. Increasing production is equivalent to overcoming labor shortage. Restricted production means additional investment in labor if only to maintain a level that should be attained by the regular equipment.

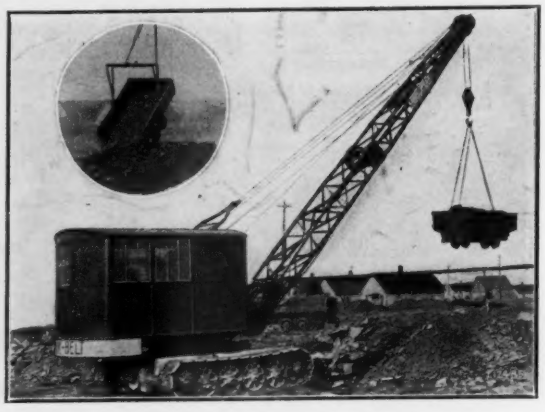
This point was very well brought out some three years ago by the Pacolet Manufacturing Company of New Holland, Ga., in the discarding of an obsolete method of power transmission and the installation of a more efficient type. That one installation, made at a cost of $3,120, gave them such increased production that it was equivalent to adding 12.7 spinning frames. And 12.7 spinning frames meant (at a cost of $150 per year per frame) something over $1,900 per year. This was an annual investment return of 27 per cent.

In like measure, Thomas A. Sizemore, superintendent of the American Spinning Company of Greenville, S. C., effected an economy equivalent to 11 extra frames. In this case, however, the annual operating cost per frame was $208.24. The saving of eleven such annual operating costs totaled nearly $2,300 a year. The labor costs thus saved was 3 men, 55 hours a week, 52 weeks a year at $0.20 per hour—which totals over seventeen hundred dollars. Adding the two items together we have a total economy effected of over $4,000 a year, or an investment return of 103 per cent, as the silent chain drives cost but $3,880.10.

Nor is the economy to be found only in power reduction, increased production or a saving of labor. Very often an economy comes in the form of a reduction in waste. Not long ago J. N. Smith, superintendent of the Woodruff Cotton Mills of Woodruff, S. C., investigated the economies effected by an installation of silent chain drives for his spinning and warp frames. And aside from making a gain in production equivalent to 5.95 spinning frames which effected a total of $3,293 a year he found that the new system eliminated the slight dripping of oil from above—which dripping spotted yarn to the extent of 20 pounds per week. This total of more than 1,000 pounds per year meant, at $0.15 a pound, a bit over $150.

Such illustrations can be secured from other places, each of them adding weight to the justifiability of installng more more efficient machinery.

Not long ago I happened to be talking to a chap from East St. Louis who, during the course of our conversation, waxed eloquent regarding a new gondola car dumper they were about to install at their plant. It seems that this car unloader will accept any gondola of standard design, regardless of its weight, height, width or capacity; that it can be operated with 35 h. p.; that the most unskilled labor can act as its operator, that is can unload gondola cars of coal at the rate of 40 an hour! Shades of needless perspiration! Well do I remember the hot summer days I put in shoveling



A CRAWLER CRANE THAT SAVED 50 MEN.

coal from a gondola, at the rate of fifteen cents a ton, and by dint of hard work and much back ache, doing about one car a day.

But such a recital as this could be continued indefinitely. All of us know of the value of labor-aiding and production-increasing devices. We know that when the wheelbarrows supplanted the loads on the backs of men, humanity was benefited immeasurably. And we know that with the electric trucks and tractors which are rapidly replacing the wheelbarrows, the human race will be still more benefited. We know that should we wipe from the face of the earth all of our power-driven machines we would find it impossible to exist for we could not crowd onto this globe enough men to produce even the barest essentials. But, as said before, we have hardly begun the application of machinery to industry. We are at least 80 per cent behind our own ability. Let us make use of the machines and devices at hand. Auto-

matization will alleviate the labor shortage, tend to level wages, increase production, better the quality of our product and reduce prices. In the words of K. H. Condit, in a recent issue of the *American Machinist,* here is the situation:

"The industries of the United States are certain to be faced with a shortage in the supply of common labor. * * * * * It is obvious that if this country is to continue to expand industrially, means must be found for doing by machinery the work done in the past by hand labor. The men to operate the machines are at hand and the capital to purchase them will be found when it is needed. It remains for the * * * * manufacturer to install the machinery to do the work of industry. A great duty and a great opportunity lie before them."

Processes for Finishing Cotton Ducks

BY WILLIAM B. NANSON.

In the preceding article it was stated that ducks and drills to be dyed subsequently into light shades should first be well scoured to kill all specks or motes or leaf in the cotton. This scouring must be accomplished at the full width of the goods; they must never be run through any machine in rope form or the goods will be permanently creased. It is also advisable that the goods after being scoured and dried should be in an absorbent condition so that the dye will penetrate the fabric thoroughly.

To accomplish this an ordinary three- or four-box dyeing machine may be used and a high pressure kier. This kier should be built of greater diameter than depth, say, 8 feet wide and 6 feet deep, and so that the whole top can be removed while being filled or emptied, the boiling should be conducted at a pressure of about 15 to 25 pounds for eight or ten hours, using the centrifugal pump with a heater to circulate the liquor.

The goods to be scoured should be run through the 3-box machine and over reels and dropped into the kier where they must be carefully distributed evenly all over the floor of the kier, leaving no channels or loose places. Two kiers will be essential, or one kier and a wooden cement lined tank of the same size or deeper. The first operation is to run the goods through diastafor, using two pounds of diastafor to each 100 gallons of water, and plait them down in the kier (or the tank) and let them lay there overnight. To do this, the first box (of the three-box machine) contains *boiling* water, the second box hot water about 150 degrees F. and the third box the solution of diastafor, which must be kept below 140 degrees F. I might say here that it would be an advantage if both the first and second boxes could be kept boiling so as to thoroughly wet the goods out provided the hot cloth coming from the second box would not heat the diastafor solution above 140 degrees F., for any heat above 140 degrees will destroy the active principle of the diastafor as will also the slightest trace of alkali.

The diastafor must be mixed in cold water in a separate tank and fed into the third box (after first filling it with the solution) at the rate of about a pailful (twelve quarts) at the end of every 150 yards or as near that as is possible, if the pieces of duck are about 55 yards in length, and are, of course, sewed together, the pailful of liquor could be fed upon every third seam or 165 yards. The fresh liquor must be fed in at the front or entering end of the dye box and after passing with the cloth through the box, overflows out at the back and should be drained into the steeping tank or kier, whichever is being used. In this manner the diastafor liquor will be all utilized.

The next morning the goods are taken up through a scutcher attached to the three-box machine which will open the goods and deliver them at full width, smoothly and free from creases to the first box containing boiling water, the second box containing cold wash water and the third box containing milk of lime or caustic soda. From the lime or soda the goods are plaited down carefully in the kier and boiled for eight or ten hours.

The writer prefers the lime boil in preference to the caustic soda though there are some plausible objections to it; again, I must admit that I have known good work to have been done with caustic soda.

The relative merits of the lime and caustic soda boils have been the subject of much discussion. It is not quite clear wherein the advantages of the lime boil lie in comparison with the extra time and processes involved, but the writer has found this: that when the lime boil is used in a high pressure kier, at a pressure of 25 pounds, the lime boil produces the best work, but that when used in a low pressure kier there is no appreciable difference between the live boil and the caustic soda boil, except that in all cases the goods will finish softer after the caustic soda process, which, in some cases, is a disadvantage.

The process of liming consists of running the cloth at full width through milk of lime (cold) in the three-box machine and into the kier as previously described. A sufficient volume of lime liquor must be present in the machine box to insure a thorough saturation of the cloth during its passage to the kier, into which it must be run in a rather wet condition.

After the goods are run into the kier, sufficient hot water, previously prepared in a separate tank, should be run in *at the bottom of the kier* to completely cover the goods, as the goods must be thoroughly immersed during the process of boiling, and the boiling must be conducted evenly and regularly. Boiling milk of lime, even under pressure, has no detrimental action upon cotton so long as the cotton is entirely immersed, but if any portion be exposed to the air, tendering takes place; this latter is the reason for running the hot water for boiling in at the bottom of the kier, for the body of liquor as it slowly rises in the kier drives out all the air that may be in the kier or entangled in the folds of the cloth and this air escapes by way of the air pipe in the top of the kier.

As was said before, the writer prefers a shallow kier, boiling at a pressure of 25 pounds by means of a centrifugal pump and heater.

After boiling, blow the liquor off at the bottom before the pressure goes off so as to blow the goods as dry as possible; follow at once, and lose no time, by filling the kier up from the *top* this time with hot water from the tank. Run this in as soon as the pressure is low enough

to allow it, or the hot kier will dry the cloth on the top and at all exposed points and stains will be developed and more or less tendering of the goods take place.

This water must be run in at the top until there is enough to completely cover the goods in the kier. Let this stand for an hour or two and then run this water off.

The goods are now taken through the scutcher and the three-box machine again. The first and second boxes contain water only in which the goods are thoroughly washed and each must be so fitted that a large volume of water is constantly running. The third box is made up with a solution of hydrochloric acid and water just lukewarm standing at 2½ degrees Tw. The goods, after this scouring operation, are plaited down again into the bin.

Sulphuric acid will answer for the scouring operation when caustic soda is used for the boil, but it will not do for lime. If there is any lime left in the goods after washing, and there always is, the sulphuric acid will convert it into an insoluble sulphate of lime. This substance is developed within the fiber itself, and being insoluble, it is nearly impossible to remove it afterwards.

Sulphate of lime will cause stains, known as lime stains to be formed. These patches of sulphate of lime, besides causing the cloth to have a hard feel, will be detrimental in the later processes of dyeing and finishing. Hydrochloric acid "sour" has no such objectionable property. This acid forms a soluble salt of lime which is very easily removed by washing.

The dyer is warned that in all cases where goods are passed continuously through a bath of any kind of liquor in a dyeing machine the bath must be strengthened to its original strength by feeding fresh liquor regularly—say, every 150 yards—as the goods pass through, this fresh liquor should be fed through a 1½- or 2-inch opening in the front or entering end and should overflow from a similar opening at the back. These two openings must be at the same level and so bored in the ends of the machine box that the box contains about 45 gallons. This refers to liming, souring and caustic soda application and, in fact, in all work in the bleachery where the goods are run continuously, unless otherwise specified.

Grey liming and souring must be thoroughly conducted. Careful attention to details is absolutely essential. After grey souring the cloth should be thoroughly washed twice in the three-box machine.

All traces of acid must be eliminated and as it is almost impossible to wash hydrochloric acid out of cotton goods, especially heavy goods such as ducks, it is advisable to add a little ammonia to the last box, or, if the goods are to be dried up, to the water box in the water mangle so as to neutralize any trace of acid that may remain.

The scouring operation is now complete. If the scoured goods are to be dyed into any light shade at once, they may be run into trucks from the washer, say, 1,000 to 1,500 yards to the truck and taken direct, without mangling or drying, to the single box dyeing machine and dyed, or, they may be dried up and dyed at some other time.

In all these operations great care must be taken that no wrinkles or creases are allowed to go through the pressure rolls of the machines; in fact, no tight creases must be made anywhere or it will "break" the goods. Duck and heavy drills are easily broken in creases and no amount of mangling or calendering will smooth them out afterwards. The goods will, of course, be more or less wrinkled when plaited down on the trucks and in the kiers, but so long as the wrinkles are not pressed in on the dyeing machine or the mangles so as to "break" the goods, these unpressed wrinkles will all come out in the subsequent mangling, starching and drying.

Caustic Soda Process of Scouring.

This process, which is the favorite one among those dyers who like to take life easy, consists of boiling the cloth in a solution of caustic soda, instead of in milk of lime. The process will be found to answer very well for most goods for dyeing, though it is not so thorough as the lime process, but it is the one generally used, and most dyers and bleachers get by with it. The following is the method of procedure:

The cloth is wet out and steeped, as described before, for lime (sometimes boiling water is used in place of diastafor and if the goods are not too heavy it will work). It is then boiled for six to eight hours in a solution of caustic soda. For ducks, a solution of caustic soda standing at 3 degrees Tw. is used. The goods are run through this on the three-box machine in place of the lime and a similar strength of liquor is prepared for the kier to be run in from the bottom, for it must be remembered that *all* the same precautions against tendering and staining by exposure to air obtain in just the same degree and in the same manner in the caustic boil as they do in the lime boil, with the added danger of imperfect circulation. Imperfect circulation in a caustic soda boil is fatal to it, in the lime boil it is not quite so particular and the bleacher has quite a margin of safety, but in the caustic soda boil he has no leeway—his circulation *must* be perfect. It is a common thing to find unboiled spots, especially near the bottom of the kier, in goods that have been scoured or bleached under the one-boil caustic system. Of course, by running the cloth *through* the caustic solution into the kier we increase the margin of safety—but there are few bleachers who do this, though it is quite essential.

After boiling in caustic soda allow the goods to steep in the liquor as in the lime, for several hours, or until cool (not cold), but be very careful that the goods are covered overhead; they must not under any circumstances be exposed to the air.

After boiling, wash and sour as in the lime process, but using sulphuric acid in place of the hydrochloric acid.

Care must be taken that the cloth does not get splashed with bleaching liquor or mineral acids (sours) especially sulphuric acid, as these liquids will produce light spots when the goods are dyed.

Now it is obvious, from the changeable character of the direct dyes under certain climatic conditions and their liability to superinduce mildew owing to their colloid and unstable characteristics, that they cannot be suitable for dyeing fish lines or nets or sail cloths, or canvas or duck for hay caps, tents, tarpaulins, horse covers, or for any goods that are to be exposed to the weather or water. In view of this, the old style system of dyeing with wood extracts and tannin matters saddened with metallic salts should be brought into play again, with all its elaborate system of mordanting, ageing and dyeing, involving the combination and precipitation of insoluble and antiseptic colored lakes on and in the fibers of the cotton.

If cotton goods are intended for use in wet places or

exposed to the weather it is essential, to preserve them from mildew, that they should be dyed with something containing within itself an insoluble antiseptic compound, and it has been found that the best way to accomplish this is to dye the goods with some coloring matter containing tannin and raise this and render it insoluble with some metallic salt. Moreover, these tannin compounds, if handled right, will dye the goods through and through, which is very necessary if the whole fabric is to be protected, whereas, the direct dyes color and act upon the surface only and effect no protection whatever to the interior of the fabric.

Tannin is, in itself, a colloid and, therefore, is in itself very conducive to mildew, but if introduced in solution into the fibers of the fabric, and then oxidized, or changed into an insoluble tannate or into japonic acid by the aid of metallic salts, it forms an insoluble and inert lake within the fiber, having very marked mildew resisting qualities and a great fastness to light and weather. This being true, it is obvious then that of all the dyestuffs containing tannin, cutch is the most valuable for dyeing duck to be used for all the purposes mentioned. All the brown, tan, and mode colors can be dyed with it either alone or in combination with other tannin dyestuffs such as sumac, bark, logwood, etc., and the metallic salts and these colors can be dyed through and will stand a prolonged exposure to the weather and are practically mildew proof.

Cutch or catechu is the most valuable of all tannin substances which give a green coloration with the persalts of iron. It may be used to produce a great number of shades on cotton goods, varying from a light drab to a dark brown.

Before the advent of the direct dyeing aniline colors catechu was extensively employed for dyeing cotton goods, owing to the great variety of drab and brown shades which it yields with various mordants and their great fastness; greenish or gray drab shades are produced with aluminum mordants alone; yellow drabs, light yellow or chamois tints and tans with tin chloride; and various shades of browns and olives with iron mordants, which may be fixed and intensified by passing the goods through a final and weak bath of bichromate of potash or soda, all of which colors, unlike the direct aniline colors, possess the merit of being both fast and mildew proof.

When catechu is dissolved in boiling water it has a gummy consistency, so that cotton cannot be dyed with it; it is necessary, therefore, to add about five per cent of copper sulphate, calculated on the weight of the catechu. This copper sulphate is added to the boiling solution of catechu in the mixing tank and not to the dyebath.

The chemical changes which take place on the addition of the copper salt to the solution of catechu is not as yet well understood. The explanation generally given is that the salt added oxidizes the catechu, producing an oxide insoluble in water, which, however, is, in turn, soluble in a solution of catechu not oxidized. As, however, the copper salt remains in the solution dissolved but unchanged, one would think that the action was not a chemical one at all, but that the copper salt acted merely as a catalyst or oxygen carrier.

The stock tub for cutch or catechu should be made up as follows: Cutch or gambier, 450 pounds; water, 450 gallons. Boil well until completely dissolved and then add 90 pounds of sulphate of copper. Boil together until all is dissolved and allow to settle overnight.

Less sulphate of copper than this will answer, down to five per cent, but the shade of the brown dyed with the solution will be much redder.

The best style of machine for dyeing catechu brown so as to insure a thorough penetration of the dye, which is essential when fastness of color and immunity from mildew are desired, is the one shown in the cut, Figure 1, and the process to be followed is something like this: The goods are first wet out in a solution made from the residue or settlings from the stock tub. When catechu and blue vitriol (sulphate of copper) are boiled together in the stock tub as described, and then allowed to settle, there is about 12 to 15 inches of sludge at the bottom of the tub which cannot be used in the dye bath. This sludge is run out into another tub and boiled up with water, and this liquor is used to wet out or boil out the grey duck for the first two runs. It is usually wet out on a single box dye machine, (shown at Fig. 1, in Part 1). This machine must be fitted with two batching drums at the back so that a whole bale of duck (1,000 to 1,500 yards) can be wound up on a roll at the back of the machine, and I will say right here

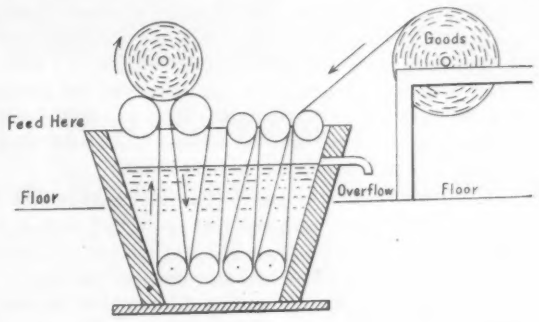


Fig. 1.

that when dyeing goods with catechu, they must be kept wound up on rolls *all through* the process. Trucks will not answer, as if the goods are run into trucks they will "air mark" and be spoiled. Therefore, the goods are wet out in boiling settlings as described and wound on rolls and let lie overnight. The neext morning they are run again through the same or similar liquor. Third, they are run through lukewarm catechu, standing at from 4 to 8 degrees Tw., according to shade required, at a temperature of not more than 120 or 130 degrees F. (no steam must be used on this box). The goods are again laid over for the night and run a second time in liquor of the same strength, on no account must this catechu be boiled while the goods are running. It must never get much above blood heat. Fifth, run on same class of machine through boiling bichromate of soda or potash, starting the machine with ten gallons of chrome liquor from the stock tub and 35 gallons of water and feeding 2½ gallons of chrome liquor on each 100 yards of goods as they run through, being careful to do the feeding at the seam as it comes up. Give two ends in this boiling chrome and make up fresh liquor for each bale of goods.

The stock tub for the bichromate of soda is made up as follows: 200 pounds bichromate of potash or soda; 400 gallons of water. The catechu, we should say, is never thrown out of the catechu machine, but (unlike the chrome)

is a permanent "tub" and is freshened up from time to time with fresh liquor, using the same quantity at the same distance apart as in the chrome.

This shade of brown is the one suitable for tents, hay caps, net twine, etc., and in all cases where an anti-mildew effect is the main result required, but a much darker shade can be obtained by saddening the goods before chroming with nitrate of iron.

Many different shades can be obtained—mode, sage, seal, etc., by adding sumac, quercitron bark, redwood, etc., and saddening with copperas, nitrate of iron, chrome, alum, etc.

By following this method of dyeing brown, the catechu liquor being cold and the goods standing overnight in it, it penetrates to the very center of the fiber before becoming oxidized into the insoluble japonic acid by the action of the chrome; the color is in the very heart of the goods; they are dyed completely through, and are of exceeding permanence and will not mildew.

Khaki.

Khaki is a shade of drab which is very largely dyed on heavy cotton piece goods, such as twills and ducks used in the army. It is one of the fastest colors known. Similar shades may be produced by dyeing with the sulphur dyestuffs, and by using substantive dyestuffs which are after-treated with copper and chromium salts, and by dyeing Alizarine dyestuffs on chromium mordants, and by the combination of some of the new vat colors. These have, however, not been able to replace the real khaki.

One of the chief objections to the real khaki is that it makes the goods very hard and that cloth dyed with it is difficult to sew through. The real khaki consists of a mixture of chromic and ferric hydrates fixed on the fiber.

The original khaki produced in England at the commencement of the late war was dyed as follows: The scoured cloth is passed through a mixture of ferrous and chromic acetates, the latter being obtained by the reduction of bichromate with glucose and sulphuric acid in the presence of acetic acid. Two passages are given through the padding machine; the liquor should stand at 36 degrees Tw. The cloth is now dried on wrapped drying cans and afterwards steamed in a rapid ager in which the steam and air are maintained at a temperature of 220 degrees F. The goods are then passed through a boiling solution of caustic soda and sodium carbonate, standing at 12 degrees Tw. The proportion of caustic soda to sodium carbonate in the fixing liquor is as 1 to 3.

This process gave a very fast color and was considered as the standard for years, but it possesses the disadvantage of making the goods very hard and, moreover, the color was not fast to acids, and it was only after the writer discovered a process by which the color could be made fast to acids that the various governments added the acid test to the other specifications. Previous to that its failure to withstand the action of mineral acids was taken as a matter of course and, therefore, nothing was said about acids in the specifications.

When dyeing khaki, especially drills for military uniforms, the greatest care must be taken to prevent the cloth from creasing or folding during scouring or dyeing, or uneven and streaky shades will often result.

The scouring and souring should be conducted at the open width, as before explained. If possible, boiling in a kier of the "Jackson-Hunt" type is best suited for this purpose.

When dyeing khaki the dyer should ever have it in his mind that the color must fullfil the following requirements and stand the following tests: A thorough hand washing and rubbing with soap three or four times repeated will test the color for its resistance to abrasion. A thorough boiling for two hours or more with common laundry soap will test its fastness to washing. A 24-hour steep in full strength lactic acid will test its fastness to perspiration. A 24-hour steep in citric acid will test its fastness to organic acids. A 10-minutes' steep in hydrochloric acid will test its fastness to mineral acids. Also, it must possess resistance to the bleaching effects of permanganates, peroxide of hydrogen and chloride of lime, and it must be water-repellent.

(This is the second of a series of articles on this subject by Mr. Nanson. Others will appear in subsequent issues.—Editor.)

National Council Meets at New York.

Stuart W. Cramer, joint president of the National Council of American Cotton Manufacturers, and W. D. Adams, joint secretary, attended a regular meeting of this organization, which was held at the Biltmore Hotel, New York, Wednesday afternoon and evening, September 5.

In addition to the fourteen representatives of the two constituent associations, the American Cotton Manufacturers Association and the National Association of Cotton Manufacturers representing the cotton textile industry of the country, there were present at this meeting invited guests representing the Arkwright Club of Boston, the Cotton Textile Merchants Association of New York, the Yarn Merchants Association and the Middle States Textile Merchants Association.

The National Council is entrusted with the task of handling, on behalf of the united industry, all problems of national concern arising, affecting its welfare.

Southern Textile Association to Meet at Augusta.

The fall meeting of the Southern Textile Association will be held at Augusta, Ga., on October 12th and 13th. The headquarters will be at the Richmond Hotel which has recently been completed. An exceptionally well attended meeting is looked for and James A. Chapman, Jr., as the presiding officer, will undoubtedly present a program that will prove interesting and instructive.

Crompton & Knowles Loom Works' employees held dedication day exercises at Knowles Recreation Park at Worcester on July 4th to pay tribute to Lucius J. Knowles, in whose memory the beautiful playground was formerly dedicated.

An interesting program was arranged for the occasion, including several speakers and musical selections by the 181st Infantry Band. The speaking was followed by the unveiling of the memorial tablet by Lucius J. Knowles, III, while the band played the national anthem. Then came refreshments, a ball game, and a number of field events.

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What the Southern Mills are Doing

Transactions involving the transfer of controlling interest in a number of more important southern mill properties held the spotlight in southern textile activities during August. Several large deals were announced, one concern purchasing two properties at a total cost of $12,000,000. This was the purchase by Lockwood, Greene & Company of the Pelzer (S. C.) Mills and the Tucapau (S. C.) Mills. Considerable interest attaches to these deals inasmuch as the purchasers are primarily an eastern organization, and factors pointed out that this expansion in their southern holdings further indicated their strong faith in the southern section as a manufacturing location. The acquisition of these two South Carolina plants gives the managing company of Lockwood, Greene & Company operating control of something over a half a million spindles in South Carolina alone.

The Pelzer property was purchased from Captain Ellison A. Smith, president of the Pelzer Manufacturing Company, one of the outstanding figures in the southern cotton manufacturing industry, and the Pelzer family, of Charleston, who held controlling interest in the Pelzer property, comprising four plants totaling 136,000 spindles and 2,559 looms. The deal involved approximately $9,000,000.

Over $3,000,000 was paid by Lockwood, Greene & Company for the Tucapau Mills, it was stated. The property includes 65,184 spindles and 1,830 looms on print cloths, and it is understood that the new owners anticipate increasing the spindleage to 100,000 with a corresponding addition of looms. It is of interest to note that this plant is located only about a mile and a half from Lyman, where the $5,000,000 cotton mill and bleachery development of the Pacific Mills is well under way. It was rumored that the Lockwood-Greene interests might contemplate the establishment of a gigantic textile development in this vicinity.

Another South Carolina mill deal of wide interest was the sale of three plants of the Victor-Monaghan Company —the Ottaray plant at Union, the Seneca plant at Seneca and the Wallace plant at Jonesville. These plants were also purchased by eastern interests, and the average price per spindle was $38.20, it was stated. C. H. Milliken, of Deering, Milliken and Co., of New York, was the purchaser of the Ottaray plant, which contains 24,740 spindles and 540 looms, and the price paid was $963,456. The Seneca plant, which has 19,840 spindles and 450 looms, was purchased by Goddard Brothers, of Providence, R. I., who operate and control several chains of mills in the East. The price paid for the Seneca property was $773,840. Ridley Watts & Co., of New York City, paid $623,220 for the Wallace plant, which contains 15,980 spindles and 424 looms. The land on which the mill and village is situated, together with machinery and equipment, was included in each deal, it was stated. It was also reported that the directors anticipate selling the Walhalla (S. C.) plant in the near future.

In Georgia, the Hartwell Cotton Mills, at Hartwell, purchased the Toccoa Cotton Mills at a consideration of $250,000. The Toccoa Mills, which are located at Toccoa, Ga., have 10,000 spindles. The officers of the Hartwell plant are John H. Cheatham, of Griffin, Ga., president; Samuel Thornton, of Hartwell, vice-president and treasurer.

A. F. Bruton and associates recently purchased the Dixie Cotton Mill at Mooresville N. C. and will double its spindleage. The name of the new company is the Cascade Mills, Inc. An addition of spindles to give the mill a total of 15,000 will be made, and 400 looms added for the manufacture of shirtings. Lockwood, Greene & Company, of Boston and Charlotte, have been engaged for complete engineering services in connection with the extension and revamping of the mill and its property. The extensions will include a two-story building 100x150 feet, and a dye house, cloth room and other auxiliary departments will be embodied in the changes.

Finishing touches are being put on the installation of 800 Crompton & Knowles looms in the new weave shed extension of the Judson Mills, at Greenville, S. C. The mill has recently added 195 new tenement houses, and has also installed a cafeteria, modern in every respect, the kitchen equipment being electrically heated. The cafeteria has a seating capacity of 200 people. Lunches will be served to operatives.

The Poinsett Mills, at Greenville, S. C., are arranging for the construction of a monitor to be placed on the mill roof. This will include a skylight more than 100 feet long which will greatly increase the light and ventilation in the mill. J. E. Sirrine and Company prepared the plans.

The contract for 600 loom motors, switch board and substation equipment for the weave shed extension at the Dunean Mills, Greenville, S. C., has been let to the General Electric Company by J. E. Sirrine & Company.

The Mojoto Mills, Inc., Laurens, S. C., have increased their capital from $10,000 to $50,000 and are planning the construction of an additional mill it is reported.

Myers Mills Inc., Gastonia, N. C., are adding 1,380 new spindles, and two jack frames, replacing 1¾-inch rings with 1⅝-inch rings.

Work is under way on the 75 new houses in the village of the Woodside Cotton Mills at Simpsonville S. C.

Industrial Cotton Mills Co., Rock Hill, S. C., are to install additional roving machinery.

Contract for electrical equipment at the Harriet Cotton Mills, Henderson, N. C., has been let to the Westinghouse Electric & Mfg. Co., by J. E. Sirrine & Company, engineers.

Between 500 and 600 acres of land have been purchased at Archdale, near Kings Mountain, N. C., for the erection of a new cotton mill. Among those interested are E. A. Smith, Sr., H. C. Dwelle, of Charlotte E. A. Smith, Jr., and James Smith, of Kings Mountain. Further details will be announced later.

Parks-Cramer Company have received contract for heating equipment of the Amazon Cotton Mills, Thomasville, N. C., and for humidifier system at the Alexander City Cotton Mill, Alexander City, Ala.

An extension is being made to the Leward Mill, at Worthville, N. C., which will be finished shortly.

Cannon Mfg. Co., Kannapolis, N. C., will erect a brick store building in the mill village, and have also awarded contract for the erection of a seven-room frame residence.

Ranlo (N. C.) Mfg. Company are building 18 new cottages, to be complete with lights, water and sewage. The existing cottages in the village are being repainted.

Elizabeth City (N. C.) Cotton Mills are arranging for

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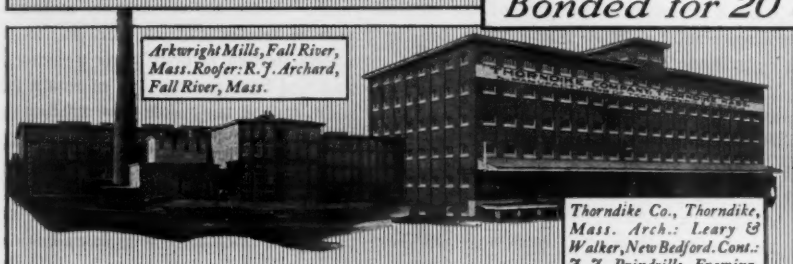


Arkwright Mills, Fall River, Mass. Roofer: R. J. Archard, Fall River, Mass.

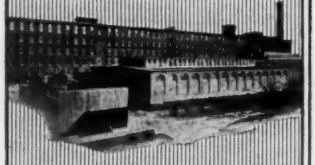
Thorndike Co., Thorndike, Mass. Arch.: Leary & Walker, New Bedford. Cont.: J. J. Prindville, Framingham, Mass. Roofer: E. H. Friedrich, Holyoke, Mass.

Bourne Mills, Fall River, Mass. Roofer: R. J. Archard, Fall River, Mass.

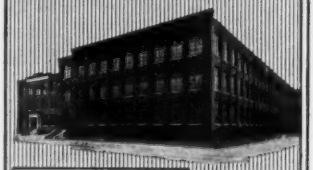
Lorraine Mfg. Co., Westerly, R. I. Arch.: F. P. Sheldon & Son, Providence. Cont.: R. A. Sherman's Sons Co., Westerly. Roofer: J. T. Maguire Co., Pawtucket, R. I.

American Printing Co., Fall River, Mass.

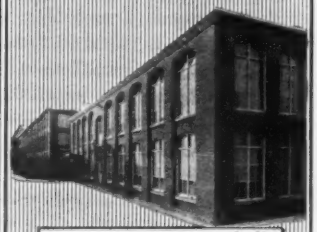
Boston Mfg. Co., Waltham, Mass. Roofers: Eagle Cornice & Skylight Works, Cambridge, Mass., & W. A. Murtfeldt Co., Boston.



Chase Mills, Burlington, Vt. Roofer: A. C. Hawthorne Co., Burlington, Vt.



Shepherd Worsted Mills, Newton, Mass. Roofer: W. A. Murtfeldt Company, Boston, Mass.



Warren Cotton Mills, West Warren, Mass. Roofer: Southbridge Roofing Co., Southbridge, Mass.

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Shawmut Mills, Fall River, Mass. Roofer: R. J. Archard, Fall River, Mass.

the erection of an addition, 65x78 feet, estimated to cost about $13,000, to be used for cotton storage.

Contract for heating and sprinkler system for the new mill of the Alexander City (Ala.) Cotton Mill has been awarded to the Grinnell Company.

Erwin Cotton Mill Co., at Duke, N. C., has ordered 1,500 new spindles and 120 looms to increase the production at their No. 2 plant.

The Norwood (N. C.) Mfg. Company will add two buildings, one to be 88 x 78 feet, two stories, and the other 50 x 75 feet, one story and basement. Carding, combing, twisting and spinning machinery, to cost approximately $150,000, will be installed.

Allis-Chalmers Mfg. Company have received contract for the motors, transformers and switchboard for the new mill of the Alexander City (Ala.) Cotton Mills.

American Net & Twine Co., Anniston, Ala., have awarded contract for the installation of a complete additional unit of dyeing equipment. They have also purchased seven new cards and will install electric power drive equipment.

California Consolidated Cotton Company, Selma, Ala., have incorporated, with an authorized capital of $750,000, to take over all of the textile mills and property of J. R. Millar in Alabama, and will operate these industries with headquarters in Selma.

Walton Cotton Mills, Monroe, Ga., are to erect 40 additional modern cottages. This is in connection with their development and expansion work, which includes a $140,000 addition.

J. E. Sirrine & Company, engineers, have awarded contract for the motors, transformers and switchboard for the 10,000-spindle addition to the Dunson Mills, LaGrange, Ga., to the Allis-Chalmers Mfg. Co.

The Harmony Grove Mills, Commerce, Ga., is planning the installation of electric power drive.

Peerless Cotton Mills, Thomaston, Ga., have purchased 10,000 new spindles which will be installed shortly.

Contract for 128 new homes of the Stark Mills, now under construction at Hogansville, Ga., has been awarded, and work begun on their erection.

Englewood (Tenn.) Mfg. Company is erecting a two-story addition, 100 x 40 feet.

Magnolia (Miss.) Textile Corporation will erect a 50 x 80 foot addition and install 50 additional looms.

The New England Mill Situation.

The New England cotton industry has been showing the evidences this month of a severe depression. Fully 8,000,000 spindles, possibly more, are running part time. Many are stopped until trade revives. Actual shortage of cotton does not exist. Most of the mills have cotton enough in hand to supply requirements, but in the absence of a profit margin in production, it is considered preferable to hoard the limited supply of old crop cotton until the new begins to move, or until the profit margin widens.

The demand for goods began to improve a little at the beginning of the month and there was some recovery from the extremely low market prices. But the rise in cotton values did little to bring on large orders for goods, while it still continued to hold the manufacturing profit within very narrow limits. In some respects the depression in fine goods has been unparalleled. Some of the older men in the fine goods trade have stated that they do not recall a year when the demand was so unsatisfactory for a long period. There have been weeks at a time when mills have not had orders enough to warrant running ten par cent of the equipment.

The change in the character of cloths and yarns wanted by the tire fabric trades has brought about idleness for many fine yarn spindles installed in the past ten years. Most of the large yarn mills are very elastic as to producing power but there seems to be less call than usual for any of the combed yarns. There are some mills making specialties for the fine wire trades, for the knitters, and for some of the specialists in fine colored yarn weaving, that have had fair orders and have managed to maintain a fair volume of production, but on the whole, the inactivity in yarns has been very marked and it has shown in long idle periods for spinning machinery.

At various times during the month, half the machinery in Fall River mills has been idle. There has also been a very large curtailment of production in Rhode Island and Connecticut mills. It is estimated that in the mills of Fall River, New Bedford, and Rhode Island not less than 5,000,000 spindles have been running short time. Several of the larger northern New England plants, like the Pacific, Amoskeag, Pepperell and others, have been operating three or four days a week only. No single line of production has been affected. All lines have been more or less quiet. Nor can it be said that old and illy equipped mills are those that have suffered exclusively.

As a matter of fact, some of the best mills in the country making ginghams, printed goods, bedspreads, fine combed yarn goods, sheets and pillow cases, muslins, etc., have been closed part of the time. There has been no inducement to run when contract business was so light that orders in sight were insufficient to keep mills employed a week ahead.

While there is a very considerable division of opinion existing as to the stocks of goods held, it can be said upon the best of authority that some of the largest plants are carrying nominal stocks only. Twenty-five years ago, for example, Fall River mills had 6,000,000 pieces of print cloths on hand at one time. Mills were financially less able to carry them and the spindleage was a quarter less. Today, stocks in that center are not believed to exceed 2,000,000 pieces of all kinds of goods and some statisticians declare that the stocks there do not amount to half that quantity.

It is known beyond a doubt, that some of the largest colored goods mills and the largest printers are carrying less unsold stock than they held 15 months ago. In any event, the firmness with which mills have declined to sell goods at many of the low prices current during the summer indicate pretty surely that there is no pressure on mills to trade continuously at a loss.

For several weeks in succession the sales of print cloths at Fall River did not exceed a single day's output of all the mills and it has been only since the early part of the month that the sales reached 75,000 pieces weekly, or about one-quarter of a week's full output at capacity. In speaking of Fall River sales, and product, no account is taken of the product and sales of the American Printing Company or the Algonquin Printing Company. They have been operating about five days weekly in the printing departments. Many sales of print cloth yarn goods reported in the New York markets were from ¼c to ½c a yard

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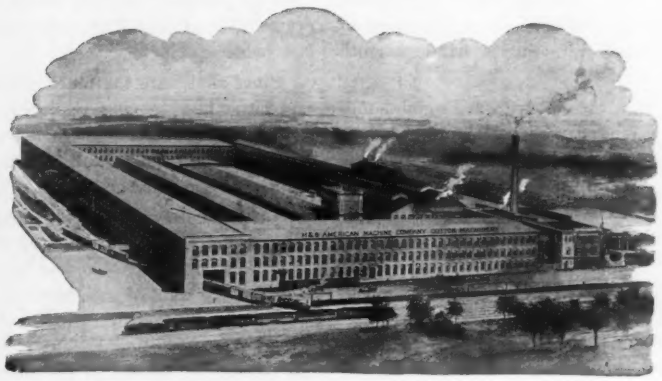

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ATLANTA, GEORGIA

under prices Fall River mills would accept. To some extent this was also true of fine yarn goods.

Ginghams have been so quiet this summer that the large New England mills have been curtailing production steadily. The Amoskeag Company has been running four days a week in the cotton goods division, and the Lancaster mills were also operated on short time. The mills making the very fine combed yarn goods or very fancy products, have sold their spring offerings moderately and are busy filling fall orders and preparing for a run on spring lines. The quietest trade has been on the cheaper end. New prices for spring are expected to be made next month and many orders have been taken, subject to the new prices then made being satisfactory to the buyers.

The trade in bleached cottons showed some improvement in the latter part of July and the first of August but it was an improvement at the sacrifice of profits. Many sales of unbranded goods were made below the cost of replacement on the date of sale and the demand for the better known brands was of a limited character. Rhode Island branded muslins have been especially quiet and it was no surprise to learn that the owners of the Lonsdale and Berkley mills of Rhode Island had purchased the Seneca mills of South Carolina, to supply some part of their gray cloths at figures that will warrant them in meeting the low market conditions.

It is a matter of wide interest in New England to note that in the new investment in southern plants, the older southern managers have been retiring. The policy of maintaining local management in southern mills will be followed, but it is thought that the retirement of the pioneers in the southern industry marks the beginning of a possible new era in southern industrial relations.

Thus far this summer, despite the great idleness among operatives in New England, there has been no attempt to reduce wages. Necessarily, with no work to do, operatives draw no wages, but in isolated cases where it has been desired to operate mills at lower wage costs, there has been indifference on the part of the workers, and even threats of trouble if lower scales were attempted. This is the more remarkable when it is stated that labor union leaders say 15,000 idle workers exist in the New England field alone.

That the depression is being felt by stockholders was shown a short time ago when the average dividends of Fall River mills for the third quarter of the year were tabulated. On a capital of $43,015,000, the sum of $677,675 was distributed, or an average of 1.575 per cent. This was the lowest average dividend paid since 1916. Next quarter this amount will probably be exceeded as the King Philip mills recently distributed a 25 per cent cash dividend in addition to the regular dividend for the quarter of 1½ per cent on a capital of $2,250,000.

The hearings that have been going on in New England mill centers on appeals from assessments made upon mills by local assessing boards for the purposes of municipal taxation, are still going on. A decision on the question of the King Philip mill case at Fall River is looked for this fall. It is believed that these cases will be drawn out for many months as the hearings have been very slow. Latterly, there has been some change in public sentiment in mill centers and the rush to overtax the mills has lessened.

Finishing plants have begun to report an improvement in the inquriy for work to be done. During July the large plants were less active than at any time in a year. It is stated that more engraving has been done by the job finishing plants than for many years past in anticipation of new spring business, but to date the converters have been very slow about putting new lines in work. One deterring factor has been that of the new printed lines shown thus far for spring to the wash fabrics buyers, very few have attracted sufficient attention to warrant owners of gray goods in taking chances of putting new stylings or colorings on them. The buyers have been pursuing a hand-to-mouth policy in all lines.

Further progress is being made by New England mill managers in the work of popularizing well known brands of goods. Very recently one of the large commission houses handling ginghams had a number of gingham frocks made in Paris and exhibited to dress-makers and cutters purchasing the fabrics. This bit of enterprise attracted considerable attention, as it gave other houses a lead in the matter of styling dresses that may be readily made at home or by cutters who are glad to use the materials whenever style direction or suggestion is given. Another house has been taking unusual care in pointing out to jobbers how some new goods in napped lines may be brought to the attention of retailers. It is intended to enlist the service of jobbers in cultivating the retail outlets rather than in going beyond the jobber to the consumer.

It is along merchandising lines that most New England manufacturers expect to find a way out of the difficulties that have beset them through short hour legislation, excessive taxation, and other hampering difficulties affecting production. Many of the oldest trademarks have been allowed to lag and it is felt that the cutters have not been shown wherein it is to their advantage to handle products of known quality rather than following each new converted line for a season or two.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, August 18, 1923.

According to Secretary Hester, of the New Orleans Cotton Exchange, the actual growth of cotton last year was 10,424,000 bales vs. 8,442,000 bales year before last. Nevertheless, because of the world having consumed 12,631,000 bales of American cotton last season, Secretary Hester made the world's carry-over of American cotton July 31st only 2,573,000 bales vs. 4,879,000 last year and 9,364,000 in 1921.

WORLD'S CONSUMPTION OF AMERICAN COTTON.

Season	1922-23	1921-22	1920-21
United States—North	2,503,000	2,292,000	2,086,000
United States—South	4,488,000	3,942,000	3,097,000
Foreign	5,640,000	6,595,000	5,147,000
Total American for year	12,631,000	12,829,000	10,330,000

WORLD'S CARRY-OVER JULY 31ST (AMERICAN COTTON).

Year	1923	1922	1921
Southern Mill Stocks	531,000	630,000	525,000
Counted Interior Towns	232,000	312,000	977,000
Uncounted Towns and Plants	184,000	964,000	3,713,000
Total Held in Cotton Belt	947,000	1,906,000	5,215,000
U. S. Port Stocks	184,000	450,000	1,335,000
Northern Mill Stocks	499,000	599,000	489,000
European Mill Stocks	520,000	775,000	630,000
European Port Stocks	423,000	1,149,000	1,695,000
Total Carry-Over July 31	2,573,000	4,879,000	9,364,000
Linters Carried Over	177,000	332,000	665,000
Lint Cotton Carried Over	2,396,000	4,547,000	8,699,000
	2,573,000	4,879,000	9,364,000

In view of the bullish comparatives at the close of July this year, it is self-evident that a large crop, at least 12,000,000 bales, perhaps more since the world consumed 12,631,000 bales of American cotton last season will likely be required for the season just opening.

As to prospects for this year's crop, returns to the government, as of July 25th, indicated a yield of only 11,516,000 bales.

Since that date the much dreaded drouth in Oklahoma and Texas has become a reality, and weevil and worms have increased and become more active and destructive in all other states of the cotton region, resulting in crop ideas being reduced further.

Unfortunately Texas is passing through one of the longest and severest drouths on record for that important state, and Oklahoma likewise has suffered from excessive heat and the want of moisture. There have been alternating widely scattered showers in the Southwest of late, but so far the precipitation has been insignificant, local and of no permanent benefit to the plant. Because of the large acreage in Texas this year—14,077,000 acres, or an increase of 15 per cent over last year—it was thought sometime ago that Texas would make 5,000,000 bales, but such prospects have gone glimmering because of the severe drouth, and it is now doubtful if the state will produce 4,000,000 bales, and because of heavy weevil and worm damage it is doubtful if the belt outside of Texas will make 7,000,000, or 7,500,000 at the outside.

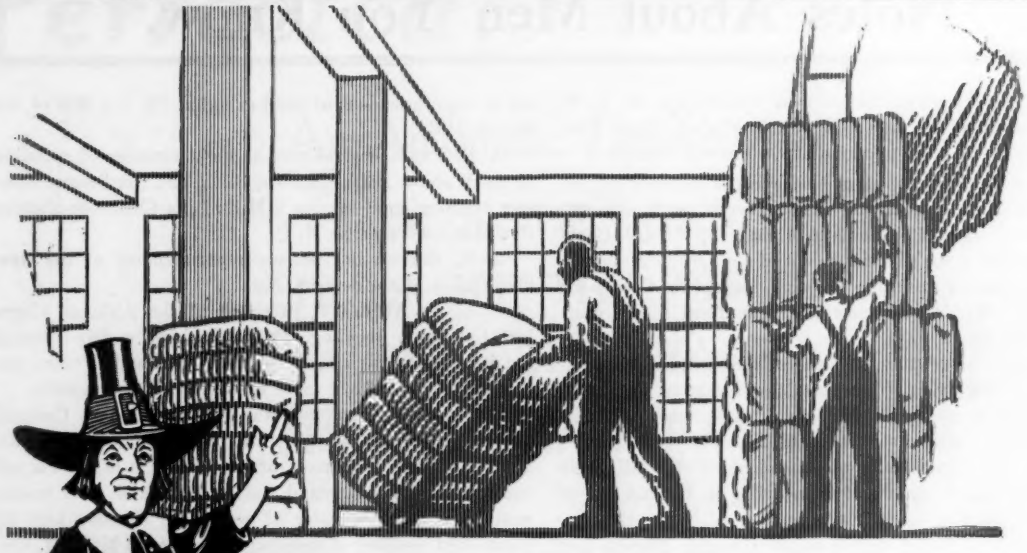
Such are conditions that the trade is confronted with and it is a serious situation for the world to contemplate, especially if the yield should fall under eleven million bales, which would prove nothing short of a disaster so far as the prospective supply is concerned.

Of course the trade has to reckon with the present unfavorable European political and economic situation, but conditions are so unfavorable abroad that any change is likely to be for the better, in which case Europe would probably need more cotton than she took last season.

When it is realized that American mills alone took 6,891,000 bales of the southern product last season, and Canada and Mexico 237,000 additional, or a total of 7,128,000 bales, and Japan and Europe 5,148,000, or a total by the world of 12,276,000 bales, whereas present prospects are for a yield of probably less than 11,500,000 bales, with no reserve of consequence to draw against, as noted by the smallness of the world's carry-over, the seriousness of the situation is apparent.

In our opinion, American mills, particularly those of the South, would do well to contract for their season's requirements immediately, as higher prices seem inevitable eventually.

Cotton yarn, cloth and roving scales and a complete line of other textile scales and balances are described and illustrated in catalog No. 36T recently issued by the Torsion Balance Co., 92 Reade Street, New York City. The booklet contains 36 pages and describes the "Torsion" and Christian Becker balances suitable for textile use.



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TIME works slowly in contact with Wahcolite. The years cannot make it chip, crack or peel; it does not turn yellow with age, but retains its brilliant whiteness.

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The Bay Stater

WADSWORTH, HOWLAND & CO., Inc., BOSTON

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Notes About Men You Know.

PAUL A. MERRIAM, formerly of Providence, R. I., is resident agent of the new plant of the United States Finishing Company to be operated at Cedartown, Georgia.

HENRY D. MARTIN, at one time superintendent of the Lancaster Mills, at Clinton, Massachusetts, and more recently superintendent of mills in Alabama and South Carolina, has been made superintendent of the Griffin Manufacturing Company, at Griffin, Georgia, succeeding George H. Redmond. Mr. Martin came to Griffin from a mill position in the East.

GEORGE H. REDMOND, who recently resigned as superintendent of the Griffin (Georgia) Manufacturing Company, has become overseer of weaving at the Stonewall (Mississippi) Cotton Mills, it is reported.

JOHN L. ROBINSON, superintendent of the Minneola Manufacturing Company at Gibsonville, N. C., and one of the more popular operating executives of the section, recently made a motor trip through Georgia, Florida and Tennessee. He was accompanied by Mrs. Robinson and their daughter, Miss Irene Robinson.

C. W. MCSWAIN, for the past eighteen years associate professor of weaving and designing in the textile department at Clemson College, has become director of textile education in the Parker School District of Greenville. This will be pioneer work for which Professor McSwain's experience at Clemson will especially fit him.

J. F. WHARTON, formerly overseer of spinning at the Griffin (Ga.) Manufacturing Company, has accepted a similar position at the Swift Manufacturing Company, Columbus, Ga.

CLARENCE B. SEAL, D. SC., director of The A. French Textile School, Atlanta, Ga., spent the summer vacation months at his home in Takoma Park, Washington, D. C.

POPE F. CALLAWAY, brother of Fuller E. Callaway, of LaGrange, Ga., died recently after an illness of several weeks.

CLAUDE L. HOWIE has succeeded R. E. McDonald, Jr., as superintendent of the Anchor Mills, at Huntersville, N. C. Mr. Howie has been connected with the Anchor Mills for 14 years, and has had charge of the weaving, beaming and dyeing departments.

C. G.BRAMLETT has resigned as overseer of carding at the W. A. Handley Mfg. Co., Roanoke, Ala., to become night overseer at the Maginnis Mills, New Orleans, La.

J. E. HUTTS has been made overseer of carding at the Aponaug Mfg. Co., Kosciusko, Mississippi. He was for merly at the Swift Mfg. Co., Columbus, Ga.

JOHN H. QUINLAN, vice-president and general manager of the Cedartown Cotton & Export Company, Cedartown, Ga., who, with Mrs. Quinlan, has been sojourning in southern California for a considerable period, is returning to Cedartown this month to again take active command at the mills. The statement inadvertently made last month concerning the promotion of C. R. Brumby, Jr., was an error we are glad to correct in justice to both parties.

CHARLES H. GOODROE has become superintendent of the Banning (Ga.) Mills, it is reported.

JOHN PROCTOR has been promoted from overseer of dyeing to superintendent of the Lexington (S. C.) Mill of the Martel Mills.

A. R. SMALL has resigned as night overseer of spinning at the Wateree Mills, Camden, S. C., and has become overseer of spinning at the No. 5 Mill of the Chadwick-Hoskins Company, at Pineville, N. C.

J. M. Battson has become superintendent of the Opelika (Ala.) Manufacturing Co.

C. SCOTT ALTHOUSE, president of the Althouse Chemical Company, Reading, Pa., is making a trip through the industrial districts of England, Scotland, France and Germany, and expects to be absent about two months.

CHARLES L. WYCKOFF, who recently died at Concord, N. C., at the age of 64 years, had been identified with North Carolina mills most of his life. He began his mill experience at Long Island Cotton Mills and after several years was made overseer of weaving. He also held the position of overseer of weaving at the Monbo Mfg. Co., Gastonia, N. C., Mooresville, N. C., and other places. He was unmarried.

L. H. THOMAS has succeeded M. C. Phillips as superintendent of the Pomona Mills, at Greensboro, N. C.

B. M. (BUCK) LATTIMORE has become associated with the United Chemical Products Corporation of Jersey City, N. J., it is announced by Robert T. Grant, Charlotte, N. C., southern manager. Mr. Lattimore will travel North Carolina in his new connection.

J. C. LESLIE, president and treasurer of Cannon Mills, Inc., New York City, died suddenly on July 23rd. Mr. Leslie was 58 years old. He was born and reared in Concord, N. C., the headquarters of the Cannon Mill chain. Here, at an early age in his career, Mr. Leslie first came in contact with J. W. Cannon, who employed him as bookkeeper in a mercantile business with which the elder Cannon was then identified. At 34 years of age, Mr. Leslie became treasurer of the Wiscasset Mills Co., Albemarle, N. C. About 1904, he went to New York to establish the Cannon Mills selling agency, and in 1916 was made a member of the firm. Four years later, when the selling agency became a corporation, he was elected treasurer, and when J. W. Cannon died in December, 1921, Mr. Leslie succeeded him as president.

WILLIAM R. SMITH, of Raleigh, N. C., has been appointed southern manager for the Atlantic Dyestuff Company, with headquarters in Charlotte, N. C. The territory handled by the southern office of this company covers the states of North Carolina, South Carolina, Virginia, Tennessee, Georgia, Alabama, Mississippi, Florida, Texas and Kentucky. Mr. Smith has been Carolina salesman for A. Klipstein & Company for the past six years and in his new connection succeeds Robert J. Walker, who died recently in Charlotte.

J. W. SISK is back on his job as night superintendent at the Grace Mill, Rutherfordton, N. C.

J. G. SCHERF, treasurer and general manager of the Andala Mills Company, Andalusia, Ala., and president of the Alabama Textile Corporation, recently incorporated, is spending some time in the East and in the Carolinas.

Perfected!

An Automatic Device that

TIMES THE LOAD

SHUTS OFF THE POWER

APPLIES THE BRAKE

SIGNALS THE OPERATOR

This sturdy and compact automatic device may be readily applied to all direct motor driven TOLHURST Extractors now in use. Does not interfere with manual operation when desired.

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ROBERT H. NORTHCUTT, president of the Marietta (Ga.) Knitting Company, died suddenly on Friday, August 24th. Mr. Northcutt was born on December 9th, 1854. He had lived in Marietta all his life and besides being president of the Marietta Knitting Company, was also connected with or interested in various other enterprises. He is survived by his wife and two sons, Ralph W. and Guy H. Northcutt; two brothers and two sisters.

L. L. HARDIN, of Columbia, S. C., formerly treasurer of the Anderson Motor Company of Rock Hill, S. C., has severed all other business connections and has become associated with the Hawthorne Spinning Mills and the Hampshire Spinning Company at Clover, S. C. Mr. Hardin is well known as a former Columbia banker and a leading figure in Columbia's civic affairs.

JOHN R. BROWN, for the past five years master mechanic at the Queen City Cotton Company, Burlington, Vermont, was killed recently in an automobile accident. Mr. Brown was born in Scotland on May 8th, 1869, coming to this country as a young man. He is survived by his wife and six children, all of Burlington, and one brother, Thomas Brown.

LEWIS DEXTER, agent of the Stark Mills, Manchester, N. H., from 1911 to the time of their sale to the Amoskeag Mfg. Co., died at Phillips House of the Massachusetts General Hospital, Boston, on Sunday morning August 19th. For a long period Mr. Dexter had been subject to heart trouble, which was the cause of his death. He was born at Providence, R. I., on March 28th, 1860, educated in the public schools of Providence and later graduated from Brown University with the class of 1883. Entering the cotton manufacturing business at the St. Croix Cotton Mills, Milltown, New Brunswick, Mr. Dexter rose to the position of manager and director, continuing with this mill until it was merged with the Canadian Cottons, Ltd. He left Milltown to become the manager of the Maginnis Cotton Mills at New Orleans, later going to the Warner Cotton Mills at Newburyport, Mass., and then to the Stark. Mr. Dexter had a wide acquaintance in the mill industry and numberless friends who were grieved at his passing.

Humidification in Knitting Mills.

Knitting machinery of the spring needle type requires careful adjustments in order that the yarn shall conform properly to manipulation; otherwise imperfections due to dropped stitches or pinched yarn will appear in the goods. If the atmosphere is too dry, static electricity develops. Close adjustment of the crimp of the needle is necessary. Minor imperfections in the yarn which ordinarily pass through the needle without impairing the quality of the product result in breakdowns, serious loss of production, and defects in the finished product.

With properly conditioned yarn free from kinks and with favorable atmospheric conditions it becomes possible to use more space in the crimp of the needle. The operation proceeds smoothly, with reduced breakage, a higher rate of production, and a uniformly good product.

With machinery of the latch needle type the question of adjustment is less serious but great improvement in quality and production due to humidification is possible, largely through the elimination of kinks in the yarn.

Humidity in the winding departments eliminates static electricity, yarn breakage, and the production of fly, while it in no way interferes with the proper functioning of the yarn cleaners.

Irrespective of humidification, proper conditioning of hosiery yarns prior to knitting is well worth while. Conditioning distinctly and permanently improves the strength of the yarn and renders it free from kinks. The frequent breakages characteristic of unconditioned yarn during knitting are clearly reflected in the imperfections in the finished work produced under such conditions at the same time.

Another stocking, knitted on the same day from the same cone of yarn on the same machine, the only difference being that in the second case the yarn had been conditioned for a period of several hours prior to knitting, produced a fabric that was free from the frequent breakages previously noted. The greatly increased strength of the yarn, its pliability and lack of any tendency to kink, were reflected in the quality of the final product.

But—to keep the yarn in proper condition humidification for both winding and knitting processes is highly desirable. The best results will be secured by practicing both yarn conditioning and humidification.

A relative humidity of at least 60 per cent should be maintained in the knitting room by automatic regulation. In extra fine products somewhat higher humidities will be found beneficial. The best condition should be determined by thorough trial in each case.

The knitting industry has been slower than the spinning or weaving industry to adopt the practice of humidification, apparently because of an unwarranted fear that the practice of humidification involves considerable risk of rust which is damaging to knitting machinery. There is, however, not the slightest danger of rust on knitting needles if humidification is properly practiced.

The humidifiers should be of a type which will not expose the machinery to the deposition of free moisture and should be so located and distributed that the machines will under no circumstances be exposed to water in case of leakage or accidental disturbance of apparatus. The chance of rust is no greater than in the card room of a yarn mill where humidifiers are now installed as standard equipment without the slightest hesitation.—From a recent bulletin issued by the Parks-Cramer Co., Fitchburg, Mass.

Plans are being prepared by Lockwood, Greene & Co., Boston, for additions to the Textile Finishing Machinery Co. plant at Providence, R. I., to provide larger manufacturing and storage facilities.

The hydro-electric development near Andalusia of the River Falls Power Company is nearing completion. 2,500 h.p. will be developed at the first unit. Three other units will be developed immediately with a total capacity of 15,000 h.p. With the advent of hydro-electric power in this territory, several new mills are contemplated.

The Andala Mills, manufacturers of high grade knit and athletic underwear has closed its lines, having booked orders to keep the plant running full capacity until June 1st, 1924. The company recently increased its capital.

Davis Septic Tank and Engineering Co., 217½ South Tryon St., Charlotte, N. C., are handling the distribution of Davis septic tanks to the textile and manufacturing trade. J. A. Groom is in charge of sales and service.

INTANGIBLES IN MANUFACTURING

A Series by

Frederick H. McDonald

The Penalty in Variety

There are those manufacturers who pride themselves on being able to produce any amount of any size or style of their kind of product—who boast of the versatility of their plants.

They are proud to be able to meet rush orders, short orders, specialty orders—catering to the whims of passing styles, and the emergencies of other people's mistakes.

This cannot be done at a profit except at enormously increased prices over staple lines—an extra that is seldom obtained.

In yarn, for instance—

In Yarn for Instance

There is an increased investment in warehouse space and raw fiber because of the demands of variety.

There are extra machines for special processes that are used only part time, with no return on the investment when idle; using, also, a lot of extra and expensive mill floor-space.

It is almost impossible to gauge exactly the amount of stock necessary in each process. This results in hordes of bobbins, spools and beams wound with surplus sizes or colors, that are stored away waiting to be used on another order of the same type—invested capital with no return, waste space, and a lot of expensive handling and rehandling.

When new sizes or colors are started through, machine after machine has to be reset—with losses in time, labor, power, and waste material in working up to the right product.

It is hard to keep the different orders separated on the floor, so that frequently extra help, and always extra supervision is necessary—which costs more money.

Sometimes there is not enough product run through to make up the order, and more has to be started from the warehouse. Sometimes too much is made up, and there is an extra supply on hand, too small for an order, and too large to throw away—investment, space, and labor wasted.

Everything connected with handling these small orders is expensive.

A profit can only be assured if a specialty is made of handling them, and a price obtained that takes care of the extra cost.

The greatest profits result from producing large quantities of a single product—the help is trained to each process, production is smooth and sure, every machine is running full time, and the minimum of space and supervision is required.

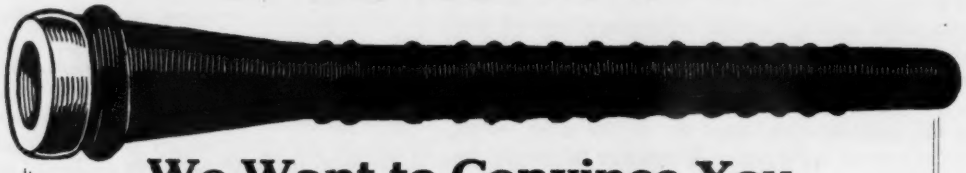
It is not always possible to spin just one size of yarn, or to make just one count of cloth, but the nearer this ideal can be approached in the handling of only large orders, in a staple line plant, the less red ink there will be on the ledgers.

It is purely a problem of policy—on the selling end, at that.

U S BOBBIN & SHUTTLE Co.

LARGEST BOBBIN and SHUTTLE MANUFACTURERS in the WORLD

Eight Factories — Providence R.I.



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of the merits and economy of U S B & S Company products and the best way we know of is to have you try them out to your own satisfaction. We are confident you will be reordering before very long.

Our years of experience, our large organization—EIGHT large plants, its staff of experts are behind every product leaving our factory. Every bobbin is of the best material available, and you are asssured of utmost quality and entire satisfaction in your dealings with us.

U S Roll quality is well known. Made especially for Universal and Foster Winders. Also underclearer rolls, plain and covered comber rolls, drawing rolls, etc.

Another famous U S product is the "Stetson" Hand-Threading Shuttle—the best exponent of hand-threading type of shuttle that has ever been devised.

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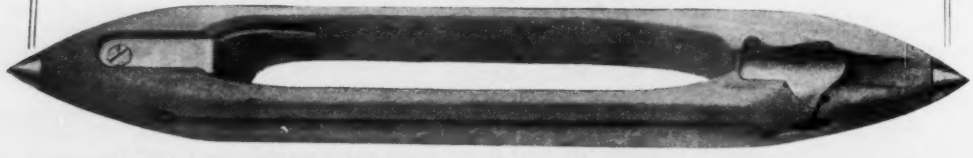
Rubber	Drawing	CAP FILLING	Underclearer
BOBBINS	Warper	FLAX SPINNING	Drawing
SHUTTLES	Twister	TWISTERS	Winder
SKEWERS	Jack	TRIPTODS	
	Silk	QUILLS	ETC.
	Belting		



"S" EYE Automatic Shuttle. Best of its kind on the market.

AN OLD TIMER SAYS

Have you got a dog? Well, if you haven't, buy one and try this experiment.

Every day when you come home, whistle or call to him before you get to the house, and as he comes to meet you, pat him on the head and say a few kind words to him. He will soon learn to look for you when the whistle blows and he will come running to meet you and you can see that he is just "tickled to death" and is very appreciative of your kindness.

Now change your tactics: pick up a stick and run him back to the house every time he shows up. Holler and cuss at him every time you see him. He will soon stop coming to meet you. And he will look out at you from under the house, and growl every time you come around.

Yes, you will say when you read this. I knew that. In fact most anybody knows it.

Well, will you please explain to me why in common sense do some overseers and superintendents try to treat people that way and expect them to be loyal?

Time is the most valuable asset any young man has. But just look how some of them waste it! Very few people seem to realize the actual value of time. Most any man can practically double his chances of promotion if he would only put to use the time he is wasting. Every day means an added brick to that foundation you are building for your future job. If a brick-mason picks up a defective brick he discards it—yet many of us let days slip into our lives which make our future foundation weak.

Do you *think*, or are you just naturally careless? While out hunting one day I asked a man who was carrying a hammerless gun if the "safety" was on, and bless my life! if he didn't pull both triggers to find out.

That's the way some overseers go about their work. They jump at the first thought that comes to mind, and pull both triggers, and then by golly if the "safety" (superintendent) is not on, they tear things all to pieces.

The pathway to a better job is generally sprinkled with perspiration.

How many beats per inch are your beaters hitting the cotton?

Does your boss consider *you* one of his *best* men?

Most any young man just *knows* he can run the job better than his father runs it.

Be patient young man. In a few years you will probably be trying to beat into a boy's head who calls you father some of the same advice your dad is now trying to give you. Then you'll realize that the old man was not such a fool after all.

If you gave a fellow a check for a thousand dollars and he just kept that check in his pocket the rest of his days to look at and show to his friends—what would you think of him?

Well, now, I think about the same thing about some overseers I know who have the opportunity to do something, but just put that opportunity in their pockets and keep it.

To keep a better man from coming along, show everyone *you* are the best.

To build up success requires work and application—we must read and study and reflect.

Think of yourself in the job you would like to be—then why in Hell don't you?

The man who is a poor manager in his home, who spends every nickle he makes and is generally in debt—well, to say the least, he'll never "set the woods afire" managing a room or a mill.

You, of course, believe in the slogan that "It pays to advertise." Are you a good advertisement of yourself?

While out hunting one day, I asked one of the party who was carrying a hammerless gun if the "safety" was on, and bless my life! if the fool didn't pull both triggers to find out.

Are you careless?

Ever thought of it? The man who spends every darn cent he makes can't put up much of an argument to his employer about how he can save for him.

A mule can't kick and pull at the same time. Yes, anybody knows that of course. Then why in common sense do so many overseers and superintendents try to do the thing that they know can't be done—kick and pull at the same time?

Whew! I'll say it's hot!

Gathering in the Fruit

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The fruits of nature are the natural results of soil, sun and rain in right proportions.

Profits, the fruits of successful business, are the natural results of *Knowledge, Management* and *Organization*.

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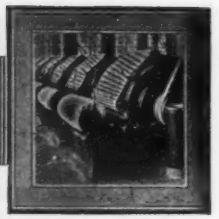


We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Slasher Waste and Clean Drop Wires.

EDITOR COTTON:

At two of the recent meetings of the Southern Textile Association, different reports and discussions were read, two of which interested me particularly, that of waste on slasher beams and the question of keeping drop wires on warpers clean.

Having had trouble with these things, I will explain as best I can the methods we pursued to eliminate the trouble. In regard to slasher waste, we had both clocks running, checking each other, for instance, say we are making a set of beams 21,450 yards. First, we have to get a combination of gears for the lease clock that will make either a 3,000-yard wrap or a 1,500-yard wrap; 21,450 yards will be seven wraps, 15 teeth. There are 30 yards to one tooth, therefore, we turn the lease clock to seven wraps then turn it back 15 more teeth which will give the seven wraps, 15 teeth, 21,450 yards. Then we set the top clock and they should both come out together; if not, there is something wrong. There are a few causes that will make the top clock imperfect. The 1,500-yard wrap would have to be set the full length of the lease clock, 10 wraps, and then turned back four wraps and 15 teeth.

The method we had for keeping the drop wires clean was a fan about fourteen inches—I mean the blades were fourteen inches—then we made a groove in the fast pulley about ⅛ of an inch deep and ran a cord or very strong string from the pulley to the fan. We never have had any trouble afterward with dirty drop wires.

If any reader would like to go further into this or any other matter, I shall be glad to give what information I can on the subject. Riverside (Mass.)

Are Picker Laps the Cause?

EDITOR COTTON:

Last February a correspondent asked the question in your discussion section:

"What is the value of testing the individual yards of laps, say, taking 10 or 20 one-yard cuts from the finisher laps once per week, when the finisher is set to deliver a lap 53 yards long, equaling 42 pounds, and the lap is 40 inches wide, and expected to average 12½ ounces per yard? The information desired in this connection is, that if the laps are true to yardage and weight in the bulk, what is the value of the test of ten cuts of a yard each?"

In the May number, on page 557, another correspondent presents a very clear and lucid answer. However, I feel that there is still another angle from which the subject might be presented and that might be worth the space necessary to so present it.

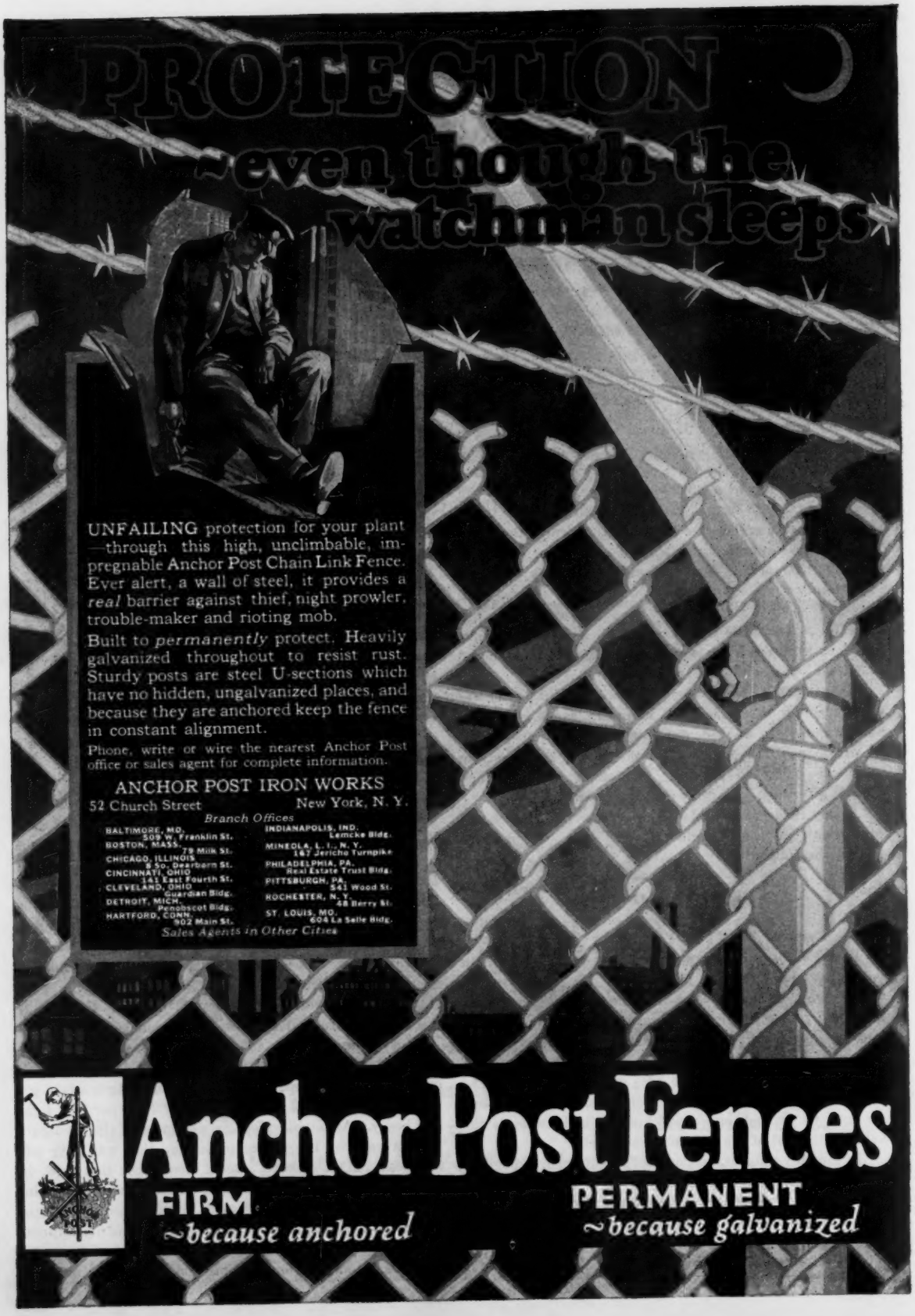
Take, for example, the case of a mill making yarns for the knitting trade. Knitters buy these yarns by the pound, but, in hosiery, for instance, they sell by the dozen, and, if they are careful manufacturers, they know exactly how many dozen hose they should secure from ten cases of any certain number of yarn. In other words, while they buy on weight, they sell on length, as it takes a certain number of yards of yarn to produce each pair of the hose they sell.

Suppose the knitter bases his figures on 50s and then, when his ten cases of 50s are delivered, he finds that the numbers run from 46s to 50s, with an average of 48s. Where is his estimated production going to come out? It is because of just such variations as these that knitters sometimes advise mills, "We are holding the last lot of yarn received subject to your order. The variation in number is so great that it will not be profitable for us to work it up, therefore, we cannot accept it."

Some of the speakers at the meetings of the Southern Textile Association have called specific attention to such variations, in some instances much worse, and some of them seem to take it for granted that such variation must be there if the individual mill man is telling the truth. But I doubt this. I know there are mills where such a variation as indicated by some of these men would call down the wrath of the powers that be onto someone's devoted head, and if the variation didn't stop *pronto* someone wouldn't have any head. It would be cut off and another man would be allowed to demonstrate his ability at producing yarn that could stick closer to the desired number. Some mills are making yarn that runs even as to number.

But let us get back to that picker problem. "Nemo" indicates in his reply that it is quite possible to find 12½-ounce laps of a proper total weight and length where individual yards would vary as much as 12½ per cent light and heavy. Admitted. Now has anyone ever tried to figure what a yard of 12½-ounce picker lap that was 12½ per cent, either light or heavy, would mean when that yard, 40 inches wide, according to the first question, is converted into 50s yarn? How many yards of yarn would be produced from that yard of lap and what would its approximate number or size be?

I don't want "Non Compos (Ala.)," who intimated



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broadly in his letter in the February number that folks who did unnecessary figuring were nuts, to get it into his head that I, too, am a nut and should have a little badge with a number on it, like a policeman or a revenue officer, pinned on my manly chest. It is not so. But I'll bet a baked yellow yam against a red apple that any mill man who takes the trouble to attempt to get some approximate figures on this problem, by the time he gets done monkeying with it, will be so interested in the results obtained that he'll be getting yarn off his spinning frames that doesn't have all that variation that Mr. Clark and the rest of them talk so glibly about.

"Non Compos" makes a lot of fun, but I wonder what he really thinks about this? And let's hear from some of the rest of the practical fellows, and "H. H. Y."—if he'll leave the trigonometry out of it. My mental wheels all squeak when I try to work out something like that now and I have an idea that a lot of other old-timers are in the same fix. Anyway, let's get at the bottom of this number variation business. Is it caused by uneven picker laps when considered yard by yard? If not, why not?

Skidoo No. 23.

Card Setting Suggestions for "No. 213."

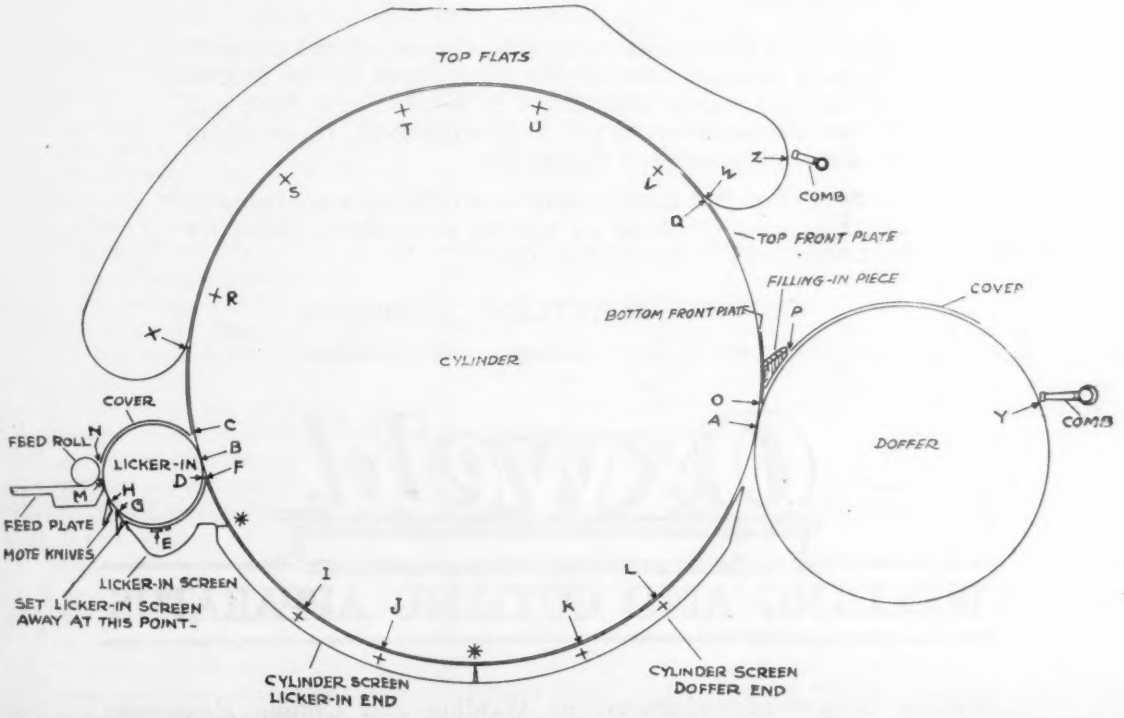
EDITOR COTTON:

With reference to the best setting for cards asked for by Contributor No. 213 in the July issue of COTTON, it would be impossible to give the best setting, not knowing the production of the card, the staple of the cotton, etc. However, I note that he is particularly interested to know the best setting to take out motes and leaf and at the same time keep this waste free from lint. In all probability his trouble is due to a defective licker-in.

If the licker-in has become badly worn or he has put in wire which is not to the right angle, this will not hold the fibers but will throw them off when revolving. No doubt, in most every case where an excess of long fiber is found beneath the mote knives, the cause is usually the defective licker-in. However, it is possible that the licker-in screen on the front edge, where the cotton enters, is set too closely. This will also cause the trouble referred to.

I am sending herewith a drawing and table showing a setting for 1 1/16-inch cotton with an average of, say, a 12-ounce lap, running at a production of 550 to 600 pounds per week. The letters in the table refer to the corresponding settings shown in the sketch.

A—doffer to cylinder—7/1000.
B—licker-in to cylinder—7/1000.
C—back plate to cylinder—34/1000.
D—top of licker-in screen to half circle—7/1000.
E—middle bar to licker-in—34/1000.
F—back of licker-in screen to cylinder—34/1000.
G—bottom mote knife to licker-in—7/1000.
H—top mote knife to licker-in—11/1000.
I—cylinder screen to cylinder—19/1000.
J—cylinder screen to cylinder—34/1000.
K—cylinder screen to cylinder—34/1000.
L—cylinder screen to cylinder—68/1000.
M—feed plate to licker-in—11/1000.
N—licker-in cover to feed roll—34/1000.
O—bottom front plate to cylinder—34/1000.
P—doffer cover to bottom front plate—6/1000.
Q—top front plate to cylinder—19/1000.
R—flats to cylinder—11/1000.
S—flats to cylinder—11/1000.
T—flats to cylinder—10/1000.
U—flats to cylinder—10/1000.



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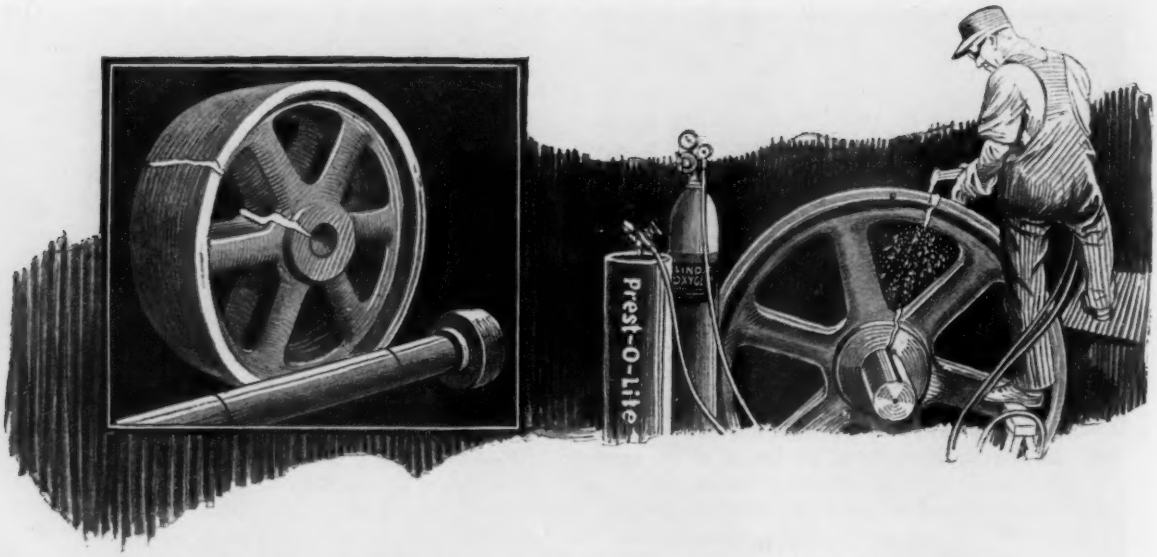

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V—flats to cylinder—10/1000.
W—flats to top front plate—34/1000.
X—flats to back plate—34/1000.
Y—doffer comb to doffer—11/1000.
Z—top flat comb to top flat—11/1000.

Contributor No. 201.

EDITOR COTTON:

In July COTTON, Contributor No. 213 asks what is the best setting for card backs. He does not state the kind of cotton he is using, and this makes a lot of difference as to settings, but I will give my ideas as to settings to get the results he wants.

He should set the screen to the cylinder at the back to a 22 gauge, the middle to a 34 gauge, the front or end next to the doffer should be ¼ inch. (On old-style H & B cards it is very difficult to get an accurate setting of the screens unless the shields that hold the screen are taken out and slots cut for the gauge.)

The licker-in screen should be set at the lip or point next to the mote knives to a full four-leaf gauge, or 34. The mote knives should be set as straight up under the licker-in as possible so as to get the heel or bottom edge as close to the licker-in as practicable, as the more angle there is on the mote knife the more fly or good stock will be thrown out. The knives should be set as close to the licker-in as possible without touching. More good stock can be thrown out by not getting the proper angle to the mote knives than by not having the screen set properly. Contributor No. 213 should not get the feed plate too close, as this cuts the fiber and causes a lot of it to fall into the mote box.

Mike (Ga.)

EDITOR COTTON:

I should like to offer a few suggestions to Contributor No. 213 in regard to card settings.

Naturally, these are governed to a great extent by the grade of cotton used and by the number of yarn being produced. Different carders have different ideas on settings, and to demonstrate the great variation, I will quote two tables—the first by W. H. Cook, a reliable English authority, and the second by a very sound practical spinner and carder:

Feed roll to licker-in	6/1000	14/1000
Licker-in from cylinder	9/1000	12/1000
Doffer from cylinder	3/1000	9/1000
Flats from cylinder	3/1000	12/1000
Comb from doffer	4/1000	11/1000
Mote knives		17/1000

I have seen neither of these in practice, so cannot personally recommend them. The only practice I can give is on Whitin cards, where a 7/1000 setting is used for doffer, licker-in and mote knives.

As will be seen from the foregoing tables, it is almost impossible to say which setting will suit different requirements. The best way is for the individual carder to experiment and judge by results. To that end I will enumerate a few suggestions which I trust your correspondent will find beneficial in eliminating his excess of waste.

A slower speed of the licker-in makes less waste and does less damage to the fiber. If the licker-in is running slow it is not so efficient a cleaner and lets motes and bits of shell pass forward, but a stronger yarn will be formed. The speed should be as low as is possible consistent with efficient cleaning.

Mote knives moved away will cause less waste to be made, also moving the flats further away gives less waste. If the back plate is moved further away, more waste will be made and the same is true with the front plate.

Any variation in the setting of the back plate or front plate will be evident in the card strips; that is, if it is nearer at one side than the other, the strips at that side will be heavier.

If the flats are speeded up, the waste will be increased. The individual strips may be lighter but the total weight will be greater.

The setting of the doffer should be as close as the accuracy of the carding surfaces will permit, so as to insure that all the carded cotton is removed and not allowed to pass around the cylinder. The comb should be set as near as possible and run at a sufficient speed; if the web hangs, then the comb speed is too low, the setting too open, or the comb stroke too high or too low. The speed of the comb must be in excess of that of the doffer, otherwise it would drag the fibers.

Doubtless this is old information, but if it helps our friend in any way I shall feel amply repaid.

N. F. (N. C.)

EDITOR COTTON:

In his question with reference to settings on H & B cards, in the July issue, Contributor No. 213 does not say anything about his licker-in speed or what kind of cotton he is carding or if he is carding for strength or cleanliness.

We are carding 1¼-inch American middling cotton on H & B cards with cleanliness as a prime requisite. Our licker-in speed is 395 r. p. m., and we set as follows: Licker-in case, 9/1000; cylinder case, 17/1000; mote knives, 7/1000; flats, 8/1000, 9/1000 and 7/1000.

If Contributor 213 desires further information, I would suggest that he state what he desires from his carding, what kind of cotton he is using, and what kind of yarn he is making or what kind of cloth it goes into.

B. U. D. (Mass.)

A Solution of the Gearing Problem.

EDITOR COTTON:

In the June issue of COTTON, I find a question in the letter of "K. (O.)" regarding gears and gear speeds. The question is about a driving shaft making 21 r. p. m., exactly 48 inches from a driven shaft making 35 r. p. m. To find the number of teeth, diametrical pitch and circular pitch of each gear—

Let $2x$ = the pitch diameter of the driving gear, and
$2y$ = the pitch diameter of the driven gear.

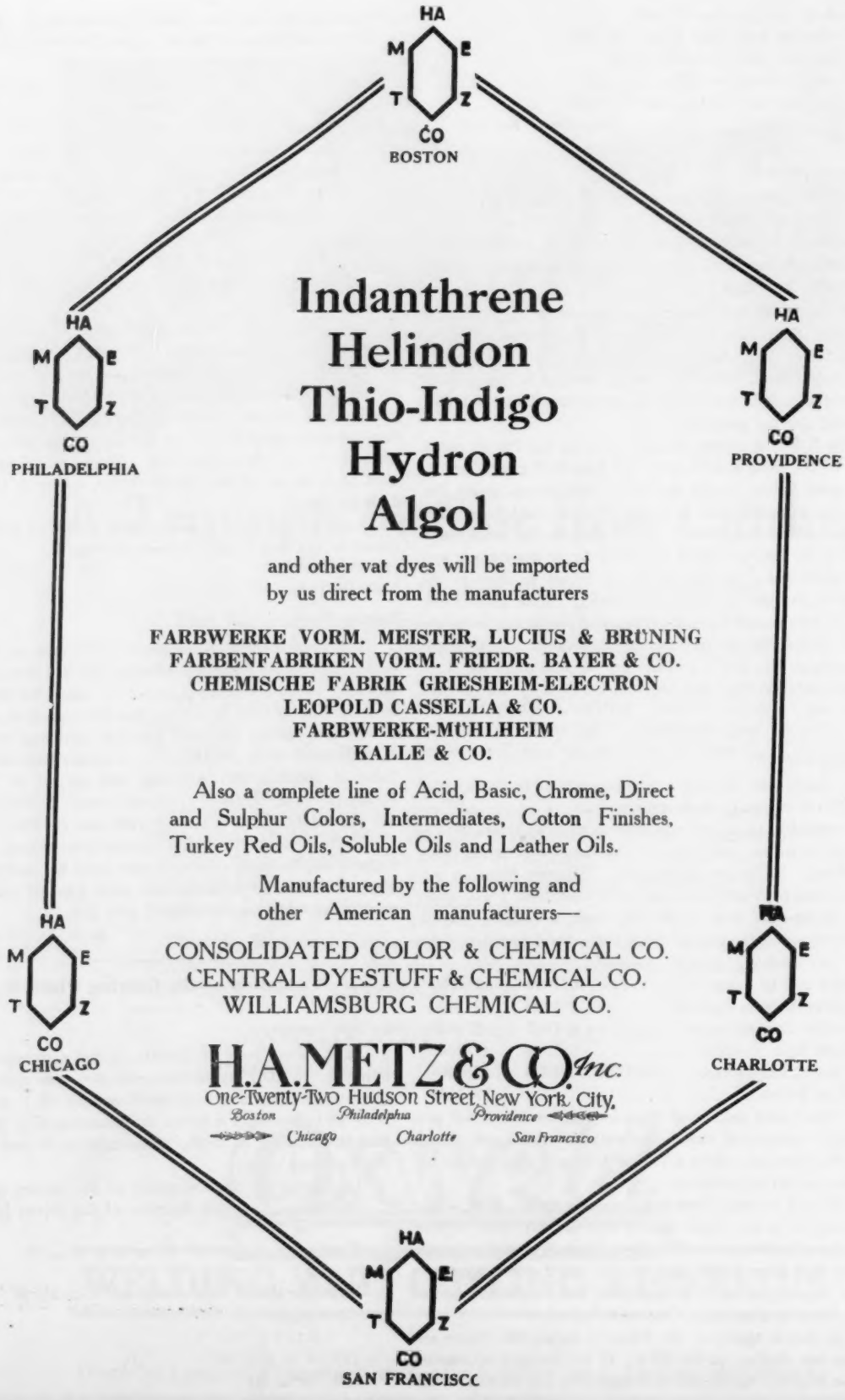
Then $\frac{2x}{2} + \frac{2y}{2} = 48$, or $x + y = 48$.

Since the speeds have a ratio of 21 to 35, or 3 to 5, we get the equation—

$3 : x :: 5 : y$

(1) $x + y = 48$

(2) $5x = 3y$



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(3) $5x - 3y = 0$
$x + y = 48$

$6x - 2y = 48$
(4) $6x - 2(48 - x) = 48$
(5) $6x - 96 + 2x = 48$
(6) $8x = 144$
$x = 18$
(7) $18 + y = 48$
(8) $18 + 30 = 48$

(9) Since $x = 18$, then $2x$, or the pitch diameter of the driving gear, equals 2 times 18, or 36. And since $y = 30$, then $2y$, or the pitch diameter of the driven gear $= 2 \times 30$, or 60.

To find the circular pitch: Multiply the pitch diameter by 3.1416 and divide by the number of teeth. The answer will be the same in both cases. The number of teeth would depend on the load to be carried and would be in the ratio as 3 to 5; such as 60 to 100, or 90 to 150, the smallest gear being the driven gear.

It may be that this will help "W. G. M. (Ala.)" with his gearing problems. H. D. (Mass.)

Pitch and Number of Teeth in Gears.

EDITOR COTTON:

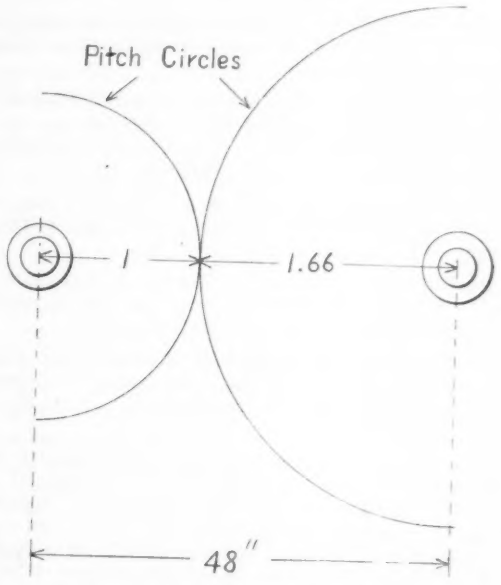
Replying to that part of the letter by "K. (O.)" in June which relates to a method of finding the circular and diametral pitches and number of teeth in gears, I should like to submit the following machine-shop method. While it is not new, it may prove useful. Mr. K's problem is: A driving shaft makes 21 r. p. m. and the driven shaft 35 r. p. m. The distance between shafts (centers) is 48 inches; find the number of teeth in the driver and driven gears, also the circular and diametral pitch.

The relation of diameters is indicated by the speeds, *viz.*, one gear will be $35 \div 21 = 1.66$ times as large as the other. The radius is equal to half the diameter. Referring to the drawing, the radiuses of the two gears equals 48 inches, and as the radiuses are to each other as 1 is to 1.66, the distance, 48 inches, equals $1 + 1.66 = 2.66$. Half the pitch diameter, *i. e.*, the diameter of the pitch circle, of the smaller gear will be $48 \div 2.66 = 18$ inches, and $18 \times 1.66 = 30$ inches for the larger one.

For any given diameter, the pitch will depend on the size (thickness) of the teeth and this, in turn, depends on the load or power to be transmitted. Since the latter is not considered, the problem resolves itself into a matter of method. Assuming that the load requires a tooth a little more than one-half inch thick, the pitch of teeth will be represented, roughly, by the number of inches in the circumference of the pitch circle. The diameter is equal to twice the radius, and the diameter multiplied by 3.1416 gives the circumference, which is $18 \times 2 \times 3.1416 = 113.097$ inches for the smaller gear, and $30 \times 2 \times 3.1416 = 188.496$ inches for the larger one. The numbers of teeth, therefore, will be a little less than 113 and 188, respectively.

As fractional teeth are, of course, impossible it is necessary to multiply both the diameters by some number that will give a product close to 113, and 188, without a fraction. First, try 3. Thus $36 \times 3 = 108$ even, and $60 \times 3 = 180$ even. Next try 3¼. $36 \times 3.25 = 117$, and $60 \times 3.25 = 195$. These products are too large, being greater than the respective circumferences. In this instance the gears may have 108 and 180 teeth. The circular pitch is equal to the circumference of the pitch circle divided by the number of teeth. For the smaller gear it is $113.097 \div 108 = 1.0471$ inches, and for the larger one, $188.496 \div 180 = 1.0471$ inches. The fraction 0.0471 is a very little less than 3/64, so that the circular pitch practically is 1 3/64 inches.

Diametral pitch is equal to the number of teeth divided by the diameter of the pitch circle. This is found to be $108 \div 36 = 3$ for the smaller gear, and $180 \div 60 = 3$ for the larger gear. There are two ways of checking-up the



RELATIVE SIZE OF THE TWO GEARS.

proportions thus found. First, the pitch multiplied by the number of teeth must equal the circumference of the pitch circle. Second, the diameter or number of teeth in the driver multiplied by the r. p. m. and the product divided by the diameter or number of teeth in the driven must give the r. p. m. of the driven.

First, $108 \times 1.0471 = 113.0868$, and $180 \times 1.0471 = 188.478$. Second, $180 \times 21 \div 108 = 35$ r. p. m. of the driven gear. Third, 36 inches = 3 feet, and 60 inches = 5 feet. R. p. m. of driven $= 5 \times 21 \div 3 = 35$, as before.

Apprentice (Ohio.)

Finishing Low Grade Ducks.

EDITOR COTTON:

I am enclosing a sample of white duck which you will notice is very stiff. I will greatly appreciate your obtaining for me, through "How Other Men Manage," a formula for producing this finish. I have a quantity of low-grade duck to starch for the blanket trade, and this is the finish they call for; the chief object being to get them as stiff as possible.

The way I have been doing this is to give them a straight corn finish passing them through the starch, then through the nip onto six cans, then through a tenter frame. But I find in doing it this way that I get all starch spots when we go above forty pounds, as the starch in the box gets so heavy after running a couple of hours that we can hardly

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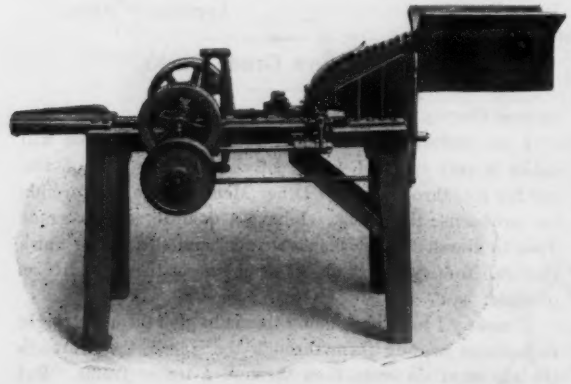

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pull them through, and they seem to break up easily on handling. Contributor No. 41.

EDITOR COTTON:

In reply to Contributor No. 41, I would say that the best way to avoid the difficulty of which he complains is to boil his starch thin and keep it boiling in the starch box, by means of a closed steam coil, all the time the goods are passing through. A little glue should be added to the starch to assist the stiffness and elasticity and prevent the subsequent breaking down.

The reason his goods break up easily on handling is that his starch is so thick and insoluble that it does not penetrate the goods, but is plastered on the outside of the fabric in a thin film which, while it may convey the idea of stiffness for a short time, is easily broken up by handling and has no permanency at all, as the great body of fabric underneath remains in a soft and unsized condition.

The writer always starched such goods twice in a corn starch, sago, and glue size, boiled thin, and while this may not be advisable nor perhaps necessary in No. 41's case, owing to local conditions of which I know nothing, it is safe and avoids all the complications involved in his complaint; moreover, it makes good, clean, even work.

Corn starch requires thorough boiling in order to insure the proper breaking up and gelatinization of the starch granules, which take longer than other starches. Sago flour makes a thinner paste, in proportion to the great adhesive strength which it possesses, than any other kind of starch except, perhaps, tapioca. Both corn starch and sago retain their strength and stiffness under a prolonged boiling; they boil thinner, it is true, but retain their stiffening properties and this is just what No. 41 requires in his case. He makes a heavy size and he boils it an hour or so until it boils thin and when he runs it into his starch box he keeps on boiling it, by means of a closed steam coil, all the time the goods are passing through.

I might say here that the starch must also be boiled in the tank either in a double-jacketed mixing tank fitted with a stirrer or in a tank and stirrer fitted with a steam coil. Live steam blowing into the starch will not answer as the condensation will thin the starch down and make it weaker, especially where the starch is to be boiled for any length of time.

Caustic soda may be used to advantage with both corn starch and sago. It helps to break up the starch granules into finer particles and besides making the starch more adhesive, it makes it penetrate better. The mode of procedure is to put the starch into the necessary cold water in the mixing tank, keeping the stirrer going, and when the lumps are all dissolved and the starch brought to a thin cream, add one pound of solid caustic soda or its equivalent of liquid for every 100 pounds (one per cent) of starch used, run the stirrers cold for ten minutes, then turn on the steam and boil until thin—say, about one-half hour. The caustic must be previously dissolved in a pail of water.

The following is a mixing often used to produce similar results to those required by your correspondent:

Water	110 gallons
Tallow	10 pounds
Corn starch	112 pounds
Sago flour	112 pounds
Ground glue	10 pounds
Caustic soda ..... 70 degrees Tw.	2 pints.

Boil thin with steam coil and keep boiling in box with coil. If sheet glue is used it must be steeped in cold water overnight and then dissolved in hot water before entering into the mixing. Corn starch may be used in place of sago if necessary that is, 224 pounds of corn starch altogether.

This is another one:

Water	50 gallons
Corn starch	45 pounds
Glue size	10 pounds
Paraffin	4 pounds

Boil thin, etc., as before. The goods are sometimes run twice in this—dry both times.

I give here a French process of stiffening goods excessively stiff which may interest Contributor No. 41. It is claimed this gives a permanent stiffness that will not come out in the wash and will last for years. Mix well together in a vessel, 24 gallons of cold water and 100 pounds of corn starch; sieve this through a fine sieve and then add gradually and constantly stirring: 25 pounds caustic soda at 36 degrees Be., and 15 gallons of cold water. Two hours stirring at least are necessary for the complete conversion of the starch, afterwards allow the mixture to rest an hour and then add: 18 pounds sulphuric acid 66 degrees Tw., and six gallons cold water. Allow to rest half an hour, then test with litmus paper and see that the mixture is quite neutral or slightly alkaline. This preparation can be thinned down when it is to be used in any proportion and can be used hot or cold, though it is better to boil it when using to get better penetration.

This is an Austrian recipe:

Water	10 gallons.
Corn starch	15 pounds

Boil and cool to 150 degrees F., then add one pound of diastafor, two pounds of glue, ½ pound of paraffin wax, and sufficient water to make 13 or 14 gallons; stir well for ten minutes and boil. After starching, dry and starch again.

Having given your correspondent all the information I possess on this subject, showing how I and others would proceed in this matter, I will say, by way of both conclusion and recapitulation, that it is my opinion that he can starch the duck, a sample of which was submitted to me, in the way he is already doing it if he will add glue to his starch and keep on boiling it until it becomes thin, put a closed steam coil in his starch box and keep his starch hot all the time the goods are passing through. A little wax also improves it and prevents the goods from sticking on the drying cans and other places.

I think there is a product on the market known as "glue flour," which is simply a ground glue and can be added dry to the starch—sheet glue or comminuted glue must be soaked overnight and dissolved in hot water before adding to the mixing. W. B. (Maine)

Oakboro (N. C.) Cotton Mills are to install 5,000 new spindles.

Victory Manufacturing Company, Fayetteville, N. C., have installed 100 Model K Draper automatic looms and additional equipment.

It is reported that an addition of 25,000 spindles will be made to the plant of the Bibb Manufacturing Company, at Columbus, Ga.

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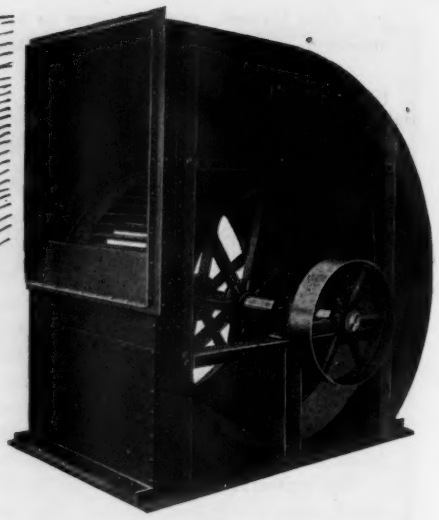

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Some Points on Warp Preparation.

EDITOR COTTON:

I have no desire to unduly take up space in COTTON, but I would like to draw attention to the letter of "T. A. D. (Ga.)," entitled "Thread Waste at the Slasher," in the July issue.

In the beginning, let me state that in all of my writing to COTTON, no one has read where I have asked any advice through its columns to remedy my own faulty or careless work. But I do not claim that I don't make mistakes, but when a mistake occurs, I do not continue at it, as "T. A. D." has apparently done, and then invent some makeshift at the next process, the slasher in this instance, to try to overcome the other evil.

"T. A. D." speaks of "flats" on a plain weave. Fifty years ago, when slashed warps were mostly leased by hand instead of being struck with a comb, the boy in picking leases would sometimes pick up two threads instead of one thread, so that the boy or girl who was handing into the drawer-in would come to two ends in the lease—that was and is today called a "flat."

But that does not mean a dressed double. At times a dressed double will occur in the best managed mills. These do not necessarily come from poor warping. A single in the making of the yarn may break from one beam and go onto the next beam and run as a double until the strings are renewed at the end of the loom beams. Any good weaver knows how to take care of this emergency.

The weave has nothing to do with "flats." If "T. A. D." were slashing warps for a Jacquard he would still be in the same boat. He speaks as if some others had applied his trouble-saver. He says he'll not at this time tell which way he has his set (that is his roll between the size box and large cylinder). There is something materially wrong in a mill where one can put his hand on a section beam running on a warper and feel the humps or ridges all over it if the yarn is anywhere near its supposed number.

I can understand beams of the above description, with which I have had to contend at times, being creeled up with some old yarn and also some newly spun yarn, one being lighter than the other; but distributing these alternately over the creel did not give the trouble "T. A. D." claims he's had with good yarn. I've no doubt but what the cloth on the warper roll and the roller at the front of the size box helps his trouble, but the remedy, to my mind, is not in line with progress and efficiency.

As to the matter of waste at the slasher and its causes, there is much to be said and done—I hope to go into this matter more fully at some other time. In the meantime, do we understand that if a set of beams run out at the slasher leaving six pounds of waste, that all sets of the same construction do the same continually? From practice I do not believe so.

Sets made on one warper have produced just as much waste in running out at the slasher as sets picked up at random. That brings us up to measuring rolls and ball bearings. I might state that I operated a warper many years ago with the measuring roll set on centers on very fine yarn. These bearings do no harm, nor will they elimimate waste at slashers. "T. A. D." reports a cutting down of 25 per cent in slasher waste by installing ball bearings on the warper. That same set might have run out the same with the old bearings. Who knows?

I am sort of skeptical about all these easy remedies. My summing up of the waste at the slasher or any other process from section beams made supposedly all one length is that it is caused by too much tension, friction or weight on the beams that are last to run out. This has been proven time and again under the writer's observation by doubling sections made with cut marks and as the cut marks came up one could tell which beam would run out first, so by arranging the tension on the beams they could eventually come out nearly alike.

The only remedy I know of to cut down waste at the slasher is a good slasher tender, one who hasn't got three or four other jobs to take care of at the same time, a clean-cut, intelligent man, with a sensitive touch, who is paid enough—so that he'll have his mind on what he intends to do, seeing that on every set put in, the grooves on the beam-heads are cleaned out, and that the tension ropes are not gummy or greasy.

These precautions will eliminate waste more than any other thing I can think of.

Lastly, with regard to who should oversee the preparatory department in any large weave mill, white or colored. The wise manager generally selects a man of tried experience, eliminating both spinner and weaver, except in some plain cloth mills. I feel profound sorrow, after having spent nearly a lifetime in the business of warp preparation—and I am still in the game—to be told by "T. A. D.," the man of troubles, that I've been on the wrong job all the time. It does seem strange to me that nobody ever called my bluff during over forty years in the states and ten in Great Britain. Therefore, I cannot agree with the assertion that no one but a boss weaver knows how to make warps—some big claim!

In connection therewith, I might mention a little incident that came up between a boss weaver and myself some eighteen years ago. I was called to a South Carolina mill to superintendend the warp preparation in a denim mill where white drills had been made. We got going good on regulars for a while then we had to make some white backs; these, as you know, are drawn-in reverse. Just as the first set was being slashed the weaver, who had the drawing-in, came to me and said, "I am going to have a time drawing-in from the opposite side." I replied, "You don't have to." He asked why, and I told him I'd see to it that the comb would be struck from the inside and that all he would have to do would be just put the beam down the opposite way from usual and turn the harness upside down and proceed as in an ordinary straight three-harness warp. Everything was okeh, and that man was much surprised and thanked me for the information. He has remained a good friend to this day.

I mention this incident to show that it is well for all of us not be quite so confident in our claims of knowledge, and that it pays to listen to the suggestions of others at times. I would like to have something said through these columns by men who ought to know whether all of our large white fancy and colored goods mills have a proficient overseer in each department, and pointing out that the boss weaver is not the only one who knows how to put good warps into the weave room. Mack (Ga.)

Who can tell something about warp tying machines?

Questionnaire on Slashing, Weaving and Twisting.

Officers of Textile Operating Executives of Georgia have mailed to every cotton mill superintendent in Georgia a copy of a questionnaire on slashing, weaving and twisting, with a few questions on bleaching and finishing. This is the organization formed by the Georgia mill superintendents and department heads in September of last year.

Inasmuch as the questionnaire contains a large number of questions of importance and interest in connection with the departments that it covers, it is reproduced herewith, and if any readers in other sections desire to comment on or discuss any of the questions here appearing, the columns of this department are open for the publication of their remarks. In conformity with the custom of this department, no names, either of men or mills, will be published or divulged in connection with such letters.—The Editor.

SLASHING.

1. What percentage of size is best for good running weaving?

2. What percentage of increased strength in yarn can be gained by using ball bearings on the slasher cylinder? Is the positive driven slasher better than the ball bearing, for strength of yarn?

3. Is thin boiling starch better than thick boiling starch? Why?

4. How long should starch be cooked before using, and at what temperature?

5. Is an open weave light wool blanket better than a close weave heavy wool blanket?

6. Should slashers be run at high speed with additional steam pressure, for drying yarn, or slow speed with low steam pressure, to obtain best percentage for added weight?

7. What temperature do you keep in the storage tank, and size box?

8. Do you ever have the size to congeal in the storage tank or kettles, and what do you do for it?

9. Do you run a lease roller between your size box and the first cylinder? What do you think of it?

10. What is a conservative number of yards to be left on a warper beam when the slasher runs out? What is a conservative percentage of hard waste made on a slasher?

11. What do you do for slack threads on the beams behind slashers?

12. What weight squeeze roll do you use? Why?

13. Which will give best results, to agitate the starch and compound in cold water before turning on the steam, or to turn on steam as soon as the starch and compound are put into the kettle?

14. How do you prevent rust spots on slashers?

15. Is it better to have separate traps for each slasher or have all slashers run into one trap?

16. Do you consider recording thermometers an advantage in sizing?

WEAVING.

1. In weaving hose and belting duck, which do you think best, a tight or slack weave? Give your reasons.

2. Do you know of anything in weaving that will increase breaking strength?

3. Which do you consider the best method of paying weavers, by the yard, pound or pick?

4. Is it a good rule to make a standard for loom fixers to work by when setting and adjusting looms?

5. Is a high sand roll better to eliminate reedy cloth? What advantage is to be had by running a high whip roll?

6. What are the best speeds for different widths of looms? State type of goods.

7. What causes most of your seconds?

8. What system have you about weavers taking cloth off at cut marks?

9. What system have you for taking care of double threads?

10. Are your brakes adjusted so that when the loom stops the shuttle will stop in the box?

11. What is considered minimum feeler waste per loom per week, 55 hours running time, 14s filling?

12. What is the best method of reducing bow in hose and belting duck?

13. What is the best method of maintaining uniform widths and crimps during changing weather conditions, with ordinary systems of humidification?

14. What is the best way to set a loom on a twill to get a good smooth bottom and also get a good face with a prominent twill?

15. What reasons can you give for a variation of picks on a piece of cloth woven in the same loom and under the same conditions?

16. Is there an advantage in using double filling fork with feelers to prevent shuttle marks? Why?

17. What would you consider the best way of timing the harness on a heavy pick fabric, either heavy sheeting or sateen, to prevent the cloth from bagging in the center?

18. What is the most satisfactory let-off motion for weaving a medium-weight goods?

19. Do you get better results in weaving from filling made with traverse going up fast and down slow or that made with traverse going up slow and down fast?

TWISTING.

1. What is the best method of avoiding making corkscrew yarn on twisters, when twisting more than 5 ply?

2. Should the speed of traverse on twisters be increased when changing from, say, two ply to, say, six ply in order to lay yarn on the twister spool evenly and smoothly, rather than piling it on unevenly as it does when the traverse is run at the same speed for two as six ply?

3. What is the largest ring that two, three and four ply coarse yarns can be successfully run on, yarn to be run with standard twist?

4. What do you consider best for these yarns: flange ring with steel traveler, or vertical ring with bronze traveler? Which would you consider best on vertical rings, steel or bronze travelers?

5. What spindle speed would you advise on a 5-inch ring twister? Could this frame be run at a faster speed with individual motor than with belt drive?

6. What is the difference in the life of a waxed band and a band that is not waxed? Is there any difference in per cent of slippage of the two bands?

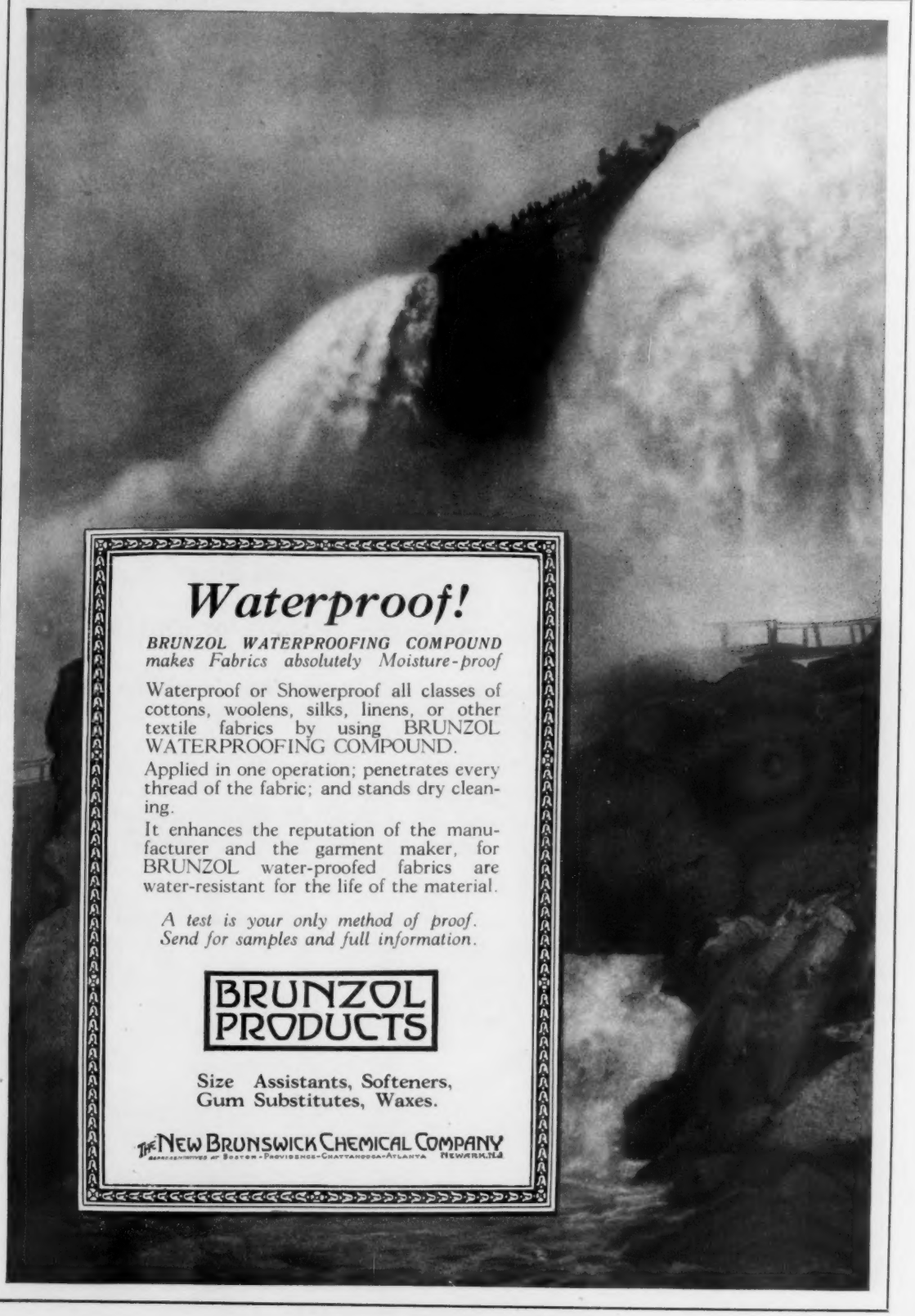
CLOTH ROOM.

1. How close to face and underside of cloth should card and emery wheels on brusher be set to obtain best results?

2. What material should be used in covering drums on sewing rolling machines?

BLEACHING AND DYEING.

1. What is the best method of saturation for yarn bleaching? What solution should be used in this? State in simple terms.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2. What is the best method of saturation for cloth bleaching? What solution should be used in this? State in simple terms.

3. What preparatory saturation should be used for yarn dyeing? What solution should be used in this? State in simple not chemical terms and offer alternatives for some few colors which require different treatment.

4. What preparatory saturation should be used for cloth dyeing? What solution should be used on this? State in simple not chemical terms and offer alternatives for some few colors which require different treatment.

A Suggestion for Knitting Mill Managers.

EDITOR COTTON:

I read the articles in COTTON each month with a great deal of interest, but I note with surprise that the operating executives of knitting mills seldom take advantage of your discussion section entitled "How Other Men Manage." Judging from the many commendatory extracts that appear on the "Among COTTON'S Readers" page, a large number of active mill men find that practical section of value in their business, and it strikes me that practical men in the knitting field could make this section equally valuable to them by taking enough interest in the proposition to write of some of the practical kinks they have found to pay in their own experience.

In order to avoid possible future criticism, I will offer a suggestion that I have found to work successfully in one of the larger mills in or around Philadelphia.

I have each girl operator inspect the hose or half-hose as they come from the machines and all "menders" or bad work is laid by the machine that produced it. It is the fixer's duty to watch out for such machines and find the cause of this bad work; discover whether it is caused by the yarn, the sinkers, the needles, or whatever it is and adjust or remove the trouble. Then he passes the bad work back to the operator.

Each operator is provided with two kinds of tickets, one marked "perfect" and the other "menders," and she affixes the proper ticket to the hose before they leave her hands.

With this system I am able to tell at the end of the day the amount of perfect work and the amount of "menders" or seconds. Also the percentage of "menders" to the total production may be easily figured. It tends to keep the fixer on the job and it educates the operators to use care in topping and transferring the work.

I am sure there are many other readers of COTTON who have numbers of similar "kinks" which they have installed in their mills that have proved valuable to them and that would prove of equal value to others. If some one offered us free transporfation service for our product we would fall over each other taking advantage of it. COTTON is offering us free transportation service for our ideas and it seems to me we are overlooking a good bet in not using it to the fullest extent possible. O. T. (Pennsylvania.)

Myrtle Mills, Inc., Gastonia, N. C., will build an additional mill and install 5,000 spindles with necessary complementary machinery.

Morven Cotton Mills, Durham, N. C., are to build an addition and install new machinery, it is reported.

The Question of Night Operation of Mills.

EDITOR COTTON:

The expediency of running a cotton mill at night has long been a query before the textile South. Many arguments for and against night running have developed from the actual experience of some mills. The chances are that many mills have convinced themselves after a trial during a certain business cycle which may or may not have proved advantageous. As yet, I do not believe that a proper study has been made of night work in cotton mills, and I would like to have the views and opinions of those who are familiar with actual night running.

There are many factors entering into night running; therefore, they should all be taken into consideration before a decision should be reached.

Naturally, in night running, overhead and general expenses are cut down, while depreciation of machinery, at least, is greater. The question arises, how much greater?

Then there is the labor factor, which I would consider an important one. What are the general characteristics of the present night operatives in mills? Is it true that they are generally a lower element than the day operatives? What effect does night work have upon the morals of the people? Is there a much larger turnover in night labor than in day labor? What methods have been used in recruiting night labor by mills, who have been running only during the day and start night work? What is the general efficiency of night labor as compared with day labor? What effect has night running upon the community as a whole? What added inducements, if any, are generally necessary to retain night laborers?

I personally feel that there are many mills who are very desirous of securing reliable first-hand information on this question, and I am sure that a hearty cooperation in discussing night work from every standpoint will be appreciated by many. J. D. R. (N. C.)

The Viewpoint of a "Broom Handle" Man.

EDITOR COTTON:

In July COTTON "H. E. R. (Mass.)" asks for a square deal for the textile school graduate. I think the textile graduate is usually getting a square deal in the game. There are some of them holding down jobs and drawing good salaries therefor to which, in my opinion, they are no better fitted than I am to the Presidency of the United States. How are they doing it? The old-timers are doing it for them, doing the fixing, keeping the machines going, and they are wearing white collars, walking around telling how much success they are having when really they are doing nothing but looking wise.

Where would our friend be if all his broom-handle men should quit and he had to fill their places with his college men? He would last only long enough for all his machines to break down. I, myself, once ran a job for one of them who tried to tell me that the spindles on a fly-frame traversed up and down instead of the bobbins. How much fixing could he do, or direct being done—and he was a bona fide four-year textile school man, not an I. C. S. man.

As to the square deal—how about the boy coming up in the mill. You can hardly get one to learn to grind cards or fix looms. The first thing they tell you is that there's no

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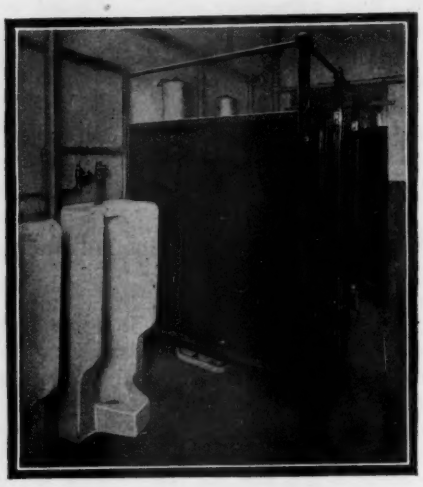

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use, they can't ever get any higher; they'd rather run speeders or weave; for all the jobs from second-hand on up will be filled with the textile school men. Is that fair to the boy who has to make a living in the mill? I don't know what the mill owners think of the way they discriminate against the practical mill men, for as sure as the sun rises, in a few years there will be no fixers. The boy in the mill is getting wise; he is nobody's fool. He believes he has no chance.

How many good mill men—and when I say good men I mean that in every sense of the word—have been replaced by the young textile school fellows, and later have to go to fixing for a living. Let me tell you, you can't blame them if they are sore and don't run up and hug every textile school man they see.

Where are we going to get the fixers for the future? You might put your college man on a section of looms and the chances are he wouldn't know how to tie on a warp. I don't want anyone to get the idea that we old-timers resent these young fellows getting soft berths if they can, but we do think the owners of the mills should give the boy who runs the drawing, doffs the spinning frames and sweeps the floors an even break with any man—I don't care if he spent twenty years in college, how much good did that twenty years do the man who owns the mill? Did it keep his wheels turning; did it help pay a dividend on the investment; did it help him, when he started with that little five-thousand spindle mill down on the creek bank, to build that big fifty- or sixty-thousand spindle mill with all its modern equipment? No. The little fellow who went to work for him early and stayed late is the one who changed that little mill into the present large one. Still he is often discriminated against in favor of a man who never even knew that little old mill ever existed—and still "H. E. R." asks for a square deal!

Who is getting the square deal? The practical man doesn't want sympathy or charity, only a fair reward for merit.

Mike (Ga.)

Practical Versus College Training.

EDITOR COTTON:

I have been reading with much interest the various letters in COTTON discussing the subject of practical versus college training. I am particularly impressed by the two extremes of the discussion as represented by the respective letters of "H. E. R. (Mass.)" and "A. B. (Ga.)" in the July number of COTTON—especially since the career as recorded by "A. B." is almost identical with my own and those of hundreds of other men who have made some advancement in the cotton mill industry. By changing dates and names I am sure many of us could almost write our experiences in his words—and each has a record of which he he may justly be proud, and while he does not say it in so many words, "A. B." leaves the inference that he, like so many self-made men I know, discounts anything but practical "hard knock" training.

"H. E. R." goes to the other extreme, as so many of his fellows of my knowledge do, for I have had quite an acquaintance with "textile" and "college" men.

It is with a desire of trying to clear up and remove some of the mist and prejudice that unquestionably exists in both camps that I am moved to write this article.

In the first place, their angles of vision are radically and fundamentally wrong or one sided. No practical man, so-called, can come over the road of hard knocks and make a success without obtaining, in some manner, much of that material which the college or technical man acquires more quickly in school; and no technical man can ever attain success without securing much of the knowledge that the practical man has acquired by experience "on the road of hard knocks." The greatest trouble is lack of comprehension and compatibility between the two classes; each thinks the other is responsible when in truth both are to blame. In truth, because of the lack of tolerance, extreme egotism, and oftentimes narrowness, due, I believe, to a lack of a liberal and balanced education in most cases rather than to selfishness, many practical men snub, discount and discourage the young technical man, while some few, out of mere meanness, refuse to give him a chance and do and say many of the things that "H. E. R." accuses them of. But in my experience of more than thirty years in some of the larger and more progressive mills, and my association during that period with many of the best mill men, I can truthfully say I have never seen a single textile man who really wanted to make good, but that got all the encouragement, aid and opportunity he wanted and deserved, and I have known not a few, but hundreds of such men; and today I number among my best friends some college men, even though I am a "hard-knock" man myself, having entered the mill before I could scarcely read or write and having stayed there until ill health and misfortune rendered me unable, about one year ago, to longer follow my life's work.

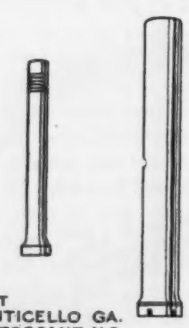
True, I have seen technical and college men fall by the wayside—and, in fact, many that I have known have been failures in so far as the practical part of mill work is concerned—and after having studied this question for years, I am convinced that the college men themselves are very much, if not entirely to blame, and for two main reasons: First, they put entirely too much dependence on their education; and second, they fail utterly to make themselves compatible.

As to their valuation of education: quoting from "H. E. R.," "But a boss cannot keep a college man on his payroll at the same pay as the other workers." Space prevents further quotation but I want to refer especially to his next paragraph in which he points out the cases of college men who have been in the mill from two to six years and still draw $1,000 less than the practical men, who, I infer, are overseers, superintendents, etc., who doubtless have spent their lifetime in reaching the positions they hold.

Just a few days ago I heard a young college man express the same thought, though differently, when he said he would finish school next year and would then be in a position to take a place as overseer in a large mill or superintendent in a small one.

Several mill men, from overseers to doffers, heard this and laughed—in their sleeves if not to his face. Such egotism or lack of real understanding leads to the "Rah-rah" boys and instructions to "Go take a course in scrubbing."

Now it is preposterous to think that any school, technical or otherwise, will ever teach a man all there is to know about running a room or a mill; for instance, the practical question of getting production and quality, the fore-



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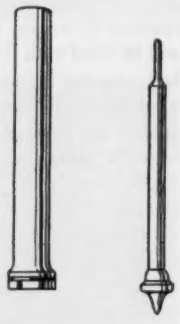

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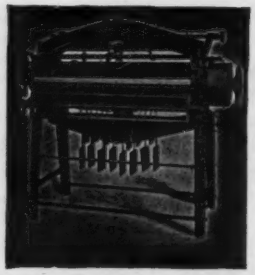

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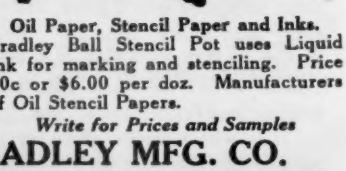

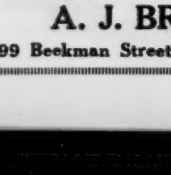

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most things in the life of the overseer and superintendent, is not, and cannot be practical in a school. True, they teach methods, but methods and practice are two different "animules" and any method applied to one place and one condition will seldom suit elsewhere.

I concede "H. E. R." the advantage he claims for the college-trained mind. It should—if it does not—enable the owner to think more quickly and more surely, and this alone, if properly utilized, will guarantee his success much more certainly than the road of "hard knocks." And here is where he should cash in and make dividends on his education, but he certainly cannot expect to do so for several years. He should understand that cotton mill work as a whole does not require any very great amount of education, and because he chances to have a college education does not warrant his expecting more pay for being a filling-hauler or even a "fixer" than any other man who is able to do this work but who does not have such education. To pay him more would certainly be unfair, and yet a college man could scarcely ever make a lasting success without getting experience in some of these less important places, if for no other purpose than to give him time and a chance to learn the human element with which he is to work, for after all it is the human factor that looms biggest in the manager's life. He can hire men to fix machines and haul filling, but he himself must know men and women and how to manage them. No school can teach this; true, the larger mind should learn more quickly, but some never even learn that this is an age of knowing men rather than machines and methods. Here is where the college man so often fails—he puts too much emphasis on methods and machines and thinks he knows all about them even before he ever really enters into the mill.

Next, with regard to the failure of college men to make themselves compatible with the mill people: There has been, ever since I can remember, too much class distinction in our mills. The mill people themselves are largely, but not altogether, responsible for this. There has been much inclination on the part of outsiders to classify them as "those mill folk," very often in a disparaging and depreciatory manner. This the mill people, those in the South at least, have always resented, too much so no doubt, and they certainly have become too sensitive to any effort to so classify and discount them. This the so-called college men seem slow to learn, and when they come among the mill people it is too often with a lofty and superior air. This alone impairs their chances of success until they learn better, for what mill people cannot digest they soon, by some means, disgorge. Many good overseers and superintendents have lost jobs they could easily have held because they were too slow to amalgamate with the people at the new place. The loftiest airplane rose from the solid earth somewhere, and the most successful mill manager has got to get down to the level of the mill people before he can rise. When once started right the rise of an educated man should be and usually is much faster, because a great deal of it is much easier for him than the man who comes up by "hard knocks" alone.

In conclusion, let me say again that both practical and technical experience are necessary and no man wishing to rise can discount either. I am reminded here of some questions asked me by my very young son once about a railroad track. As we were crossing, he asked, "Papa, what is this?" "A railroad track," I told him. He next asked, "And what is this long iron here?" "A railroad track," was my answer. "And what is this other long iron here?" he continued. "A railroad track," I replied. "And what are all these logs here?" "A railroad track," I answered.

There is but one track to success in the cotton mill, and that, like the railroad track, is composed of two good strong rails, that of "Theory" and the other of "Practice," and these can be bound together only by the "ties" of common sense. When any of the three factors are out of adjustment a wreck may be expected. And every man must build his own road, through whatever cuts and fills may beset his course. The college man, over a period of years, should have much the easier job, but if the first few miles steer him to a tunnel he must be willing to dig through, go back for another survey, or quit. T. T. C. (N. C.)

How to Apply a College Education.

EDITOR COTTON:

(I have addressed the following remarks directly toward "H. E. R." and other college men who may have adopted his attitude as indicated in his letter in the July issue, and should like to have you present them in that manner.)

"H. E. R.," your dope is bad. Things can't be half as bad as you would have us believe from your article. Why do your fellow operatives laugh at you? Why are you and your friends under the $1,000 mark at the end of five years? Why not take stock of yourself and see if the trouble isn't pretty close to home? I know of many college fellows who have entered the mill "to learn the business" and have made good.

In fact, I am a college graduate myself, and have not had the terribly trying experiences that you relate. To be sure, there have been trying times, but the encouraging days have outnumbered the other kind, so why belly-ache about the disappointments?

Four years ago I received my A. B. degree from one of the largest universities in the country. At that college we were not dragged into activities, paraded around with freshman hats on, or fussed over in the least. The authorities evidently believed that there was a niche for every man, but that he must find it for himself. Their wisdom was sound, I believe, for the conditions I met when I stepped out into the work-a-day world were similar to those at college. My employer hired me and let me work out my own salvation.

As I was rather active in athletics during my college course, I had an opportunity to see the other type of undergraduate. We took numerous trips to other universities and prep schools. In some I saw so-called "college spirit" which subordinates the individual to the group. Now, buddy, when you are working in a cotton mill, you are your own agent and not a whole cheering section. The yelling you do isn't going to get you half so far as the hanks you turn off. Nor is that Phi Beta Kappa key or fraternity pin going to boost your stock one iota even if you wear it on your overalls.

I confess that it took me a few months in the mill to realize just what my education was worth. Upon entering the mill I was assigned to a crew that was erecting cards. After wiping "gunk" from new parts for a longer time than I thought necessary, I was placed with a fitter whom

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we will call Pat Murphy. Pat could chew more tobacco in one day than I had thought existed three months before. Also Pat could work or he could talk—but he couldn't do both at the same time. This I did not learn until later. Being by nature rather inquisitive and having read in college that many great men had attained success by the question method, I began at once to ask questions of Pat. My answers were usually a shot of tobacco juice toward the pedal extremities, but I kept on for I had also read at college that persistence is a virtue. At last Pat could stand it no longer. "Damn you, how the hell can I work with you asking all them damn fool questions?" and with that he turned on his heel.

I said to myself, "There goes my chance of being a famous mill man. If I can't ask questions, how can I learn?"

It was my first real hurdle. I had to clear it or take a bad tumble right at the start. The mere fact that I was a college man did not enhance my value in Pat's eyes one bit; probably when he was not sore at me he was sorry for "that poor college boob." At any rate I had to make him like me or at least work with me. I felt that the owners of the company, although not helping me, were at least watching and what they wanted was results, not degrees or college records.

So I studied Pat and studied my work, kept my mouth shut and my eyes open. To make a long story short, in a few weeks Pat was breaking his neck to show me what he knew, was telling me of his personal affairs, and, when the big football game of the year took place back at college, he, unbeknownst to me, asked the boss that I be allowed a half day off so that I might be present. We became the best of friends—although I never could chew his tobacco. Meanwhile I got out of my job just what I put into it. It was what I was doing on the job, not what I had done at college, that counted.

Many college men come into the mill with the idea that they must be human blotters. They want to get knowledge so quickly that they have no time for work. I soon learned that I retained the information I gained through work, but quickly forgot the answers to questions that I could get through mere asking. The former method seemed to fix things much better. Of course I learned much from books and much from other men, but I preferred the "dig" system. The same had been the case at college, but the mill drove the truth home. Now, "H. E. R.," honest, haven't you been doing too much blotter work, haven't you been asking too many questions without using that trained brain of yours for constructive thinking?

You say you have a trained mind, yet you admit that you haven't yet discovered a way to use it. That doesn't sound right. Isn't the trouble again with that mental attitude of yours? Did your trained mind help you to keep your floors scrubbed better than any other floors in the mill? Did you rate 100 per cent on that job? Did you scour them so well that your boss could say, "There is a fellow who does one job well; I can trust him to do a better job in the same way?" Did you show better results than the non-college man? It is results that count, buddy.

At the same time, are you gaining the respect and confidence of your co-workers? If you are not, you can't run a room whether you are "24, 30 or 50." Most workers are fairminded, but they want to be shown. Show them that you are sincere, fair, and capable and most of your troubles

are over. More hard work (and remember that the average cotton mill worker respects manual labor), more real application of that trained brain, less belly-aching, and you will be able to say to your fellow workers, "Follow me."

I am sorry that you regret your college, and even your high school education. You must have written that sentence after an exceptionally blue day. Personally, I regret that I did not return for a year or two of graduate work. I am still trying to make up for those extra years by night study, and find the going very tough. That education is valuable, but only as I put it to work. Telling somebody about my fund of knowledge is not going to get me anywhere. I know, for I've tried. If I use it rightly, someone else will do the telling and much more to my advantage. The trouble is not with your education, but with your mental attitude. Get that straightened out and things will at least seem to move more smoothly. See if you can't get a better philosophy of life. When you get a good one figured out, let me know. I'm looking too. It is yourself that needs ironing out, not the world. You are hollering, "I'm all right, the world's all wrong." Forget it, clean house, think right.

I am a queer bird to be talking to you this way, when I probably need the shaking up even more than you and your friends. I have plenty of troubles. Right now I could tell my boss how to run his business if he would let me. And, of course, I could go in and run it better than he is running it—if he would let me. But my task there is to convince someone of the fact, not merely broadcast it to the world. When I can do that, I may be a superintendent, not just an overseer as at present.

And my college education is going to help, not hinder me. It has taught me how to recognize hurdles and plan a way to surmount them. It has taught me to profit by the experience of others. It is a tool with which I can fashion my conduct and carve out my niche, be it big or small.

I can't waste time blaming others for the fact that I am not a superintendent. If I had put more energy, and more college training, into my work during the past four years, I might be one now. Perhaps you, too, "H. E. R.," would be a "super" or a big boss if you had used your knowledge and training instead of advertising the fact that you are a college man. Try it, and the best of luck! Bill (Mass.)

Just Another College Man's Opinion.

EDITOR COTTON:

Inasmuch as I am a college man, I have a tender spot in my heart for college men as a whole; yet it seems to me that there are many college men today who are doing much to earn the ill will of all who work near or with them. Because the college man boasts a trained mind, one that can assimilate knowledge of whatever sort quickly, he should the more easily overcome the very natural prejudices of the so-called "practical man."

It has been my short experience that the "practical man" enjoys pouring out his knowledge to anyone who shows the right spirit. Of course, he won't help the know-it-all "Rah-Rah" type, but he will be only too glad to help the energetic, modest, sympathetic fellow.

I believe that the college man of the right sort has a wonderful opportunity in the business world and in the cotton mill in particular, for the one lasting and really valuable asset of a college education is a broadened horizon and the ability to think a thing through—the tendency to use reason instead of emotion or prejudice as a guide to actions and decisions.

We, college men as a class, are apt to think that the world should be at our feet because of our boasted brain power. When, as a matter of fact, we have got to produce the "goods" just as truly as anyone else. The "practical man" in the mill who knows his job because he has worked at it for years, probably has as much native ability as the average college man, in many instances much more. Does such a man enjoy having a young up-start who boasts a college education or degree work with him? Yes, if that young man understands human nature and will treat him sympathetically as his equal. No, if the young fellow assumes an attitude of superiority. A few days or weeks scrubbing floors or washing windows or, in fact, any other dirty job, if he works hard and well and willingly, will win the admiration and respect of your "practical man." He will see that the college man is not afraid of a bit of dirty work and he, the "practical man," will quickly be won over.

Every man worth the name is proud of his handicraft or skill and is only too glad to help the young fellow with the right spirit. Of course there are exceptions, but on the whole human nature is the same.

I think that the college man of the right sort, given the time necessary to show the men in the mill the stuff he is made of, will be among the most popular and useful hands in any mill. It is up to the college man to show that he is a regular fellow and not assume an air of superiority. If such a course is followed, it is my humble opinion that with the possession of a broad outlook on life and a trained mind, the place of the college man in the cotton industry or, in fact, in any other industry, is secure, and how far he can go depends, as with everyone else, upon individual perseverance and character. A College Man (Mass.)

Adjusting English and American Builders.

EDITOR COTTON:

Most fly frames in operation build a good bobbin of roving. However, you will find in some mills that the bobbins have a ragged appearance due, in most cases, to the builder being out of order. As a rule, a carder may be an expert in the operation of the English builder and yet have his troubles with the American builder. Few carders understand the advantages and disadvantages of both types.

Let us assume that a fly frame equipped with the English builder is making a ragged bobbin, top and bottom. In such a case the best method I know of is to wait until the frame is doffing and then run the carriage until it reaches the middle of the bobbin. Next remove the poker-bar pinion, also the poker bar, and clean both thoroughly. Replace the poker-bar and set to the end of the slide to ¼ of an inch.

Then get a spirit-level and level the poker-bar. This will give exactly the same taper on each end of the bobbin. Next, square the latches to the rocker, and if, in doing this, it is found that there is not a comfortable space between the twin gears, remove the rocker, saw down on the side and insert a piece of steel having the same thickness as the amount filed from the latches and rocker. Next, raise the

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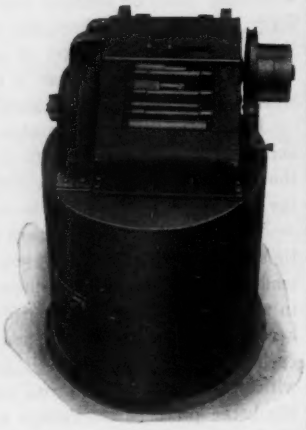

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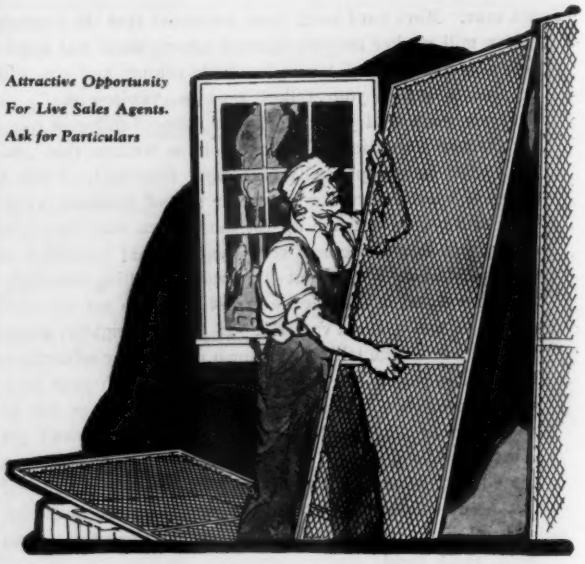

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latch screws and start the frame and set the carriage at the top and bottom, and if other conditions are right, a perfect bobbin will result.

The chief advantage of the English builder is that if the rack fails to move laterally, it does not prevent the carriage from changing at the completion of the traverse. Another advantage is that if the roving bobbin appears ragged on only one end, the trouble can be easily determined by rubbing the latch with emery cloth. After doing this, if the bobbin has the same appearance, in almost every such case the trouble will be found to be in the twin gears or their connections.

The chief disadvantage of the English builder is found in the type of its rack gear. It takes a lot of patience to adjust a rack gear so that the same exact amount of movement is given to the rack at the completion of the traverse top and bottom.

When the roving appears larger in diameter on one end of the bobbin, this is caused by the rack gear being moved on only one side.

The chief advantage of the American builder is that it moves the rack an even distance at the change of each traverse. Its chief disadvantage is that if the rack fails to move, it stops the tumbler shaft and the rail or carriage will not change at the completion of the traverse, but will instead run until it comes in contact with the safety which knocks off the shifter to the loose pulley. This, of course, causes every end to come down, which results in a loss of production besides the labor and waste.

Many fixers, second hands, and even carders have the wrong dope regarding the amount of tension required on the spring that moves the tumbler shaft to the action of the top cone bevel gear to engage the skip gear. I have seen so much tension on this spring that one could hear the bang against the builder an alley or two away from the frame. The amount of tension on this spring should be just enough to give the tumbler shaft enough movement so the skip gear will be engaged by the bevel gear on the end of the top cone bevel gear.

When the tumbler shaft fails to move without a high tension, the trouble is not in the tumbler shaft; 99 times out of a 100 the trouble is found in the rod connecting the eccentric and twin gears. The best method to discover this trouble is to first remove the twin gear pinion, or make a disconnection if the frame is so equipped. Next loosen the bearing near the lay gear and set so that the rod and shaft will have the most freedom. Next start the frame again and take off a little tension at each traverse until the tumbler shaft seems to lag a little. In such a case one must be ready to help the tumbler shaft so the frame will not run over or under. In this way the exact amount of tension is secured, which increases the life of the builder and also of the frame.

In some cases, when the tumbler shaft fails to move, this is due to some of the following causes: (1) one or both twin gears may be set too deep; (2) foreign matter may have collected on the surface of the eccentric; (3) the step of the tumbler shaft may be dry from lack of oil, or may be clogged with dirt; and (4) when the longest traverse possible is attained, the safety is raised and brought in contact with the rack, which checks the movement of the tumbler shaft. The latter cause is puzzling to some carders. Wash (R. I.)

A Remedy for Long and Short Warps on Section Beams.

EDITOR COTTON:

With reference to long and short warps on section beams, which are being discussed quite a bit at the present time, I give you herewith my theory for one method of remedying this difficulty. It has been my experience that a cause that contributes to this condition is that at the moment the warper knocks off, due to a broken end, the momentum of the spools in the creel is so great that they "pay off" more yarn than the rise roller will take care of, thus creating a loss of tension on the measuring roll while the forward beam keeps traveling. I have overcome this by letting down the guide rod on the back so as to put more bearing of yarn on the back roller and then putting a piece of lace leather, with a small weight attached, to create a friction on the back roll to hold the tension between it and the front roll; and also seeing that there is not too much weight on the rise roll to throw it up too suddenly.

The longest beams are the ones on which the largest number of broken ends or stops occur, which is due to the causes indicated, and with the slack properly taken care of, this condition should be reduced. S. M. C. (Ga.)

Spare Hands and Training Operatives.

EDITOR COTTON:

Being a believer in having spare hands around the roving frames, I have been slow to say anything about the question asked by "B. E. (Texas)" in the May issue, but on seeing Ted's opinion in the July number, I have decided to say a few things on the question of whether spare hands on speeders pay.

I was taught in the card room by being a spare hand around speeders, and we have all got to be taught before we can know anything. We can't all go to technical schools, and learn that way, and, anyhow, learning by actual experience is the best way, for we not only learn the whys and wherefores of a lot of things that arise in cotton manufacturing, but we learn the habits of the operatives also, which is the one main factor in the management of a room or mill. We learn how it feels to be an operative and to work up from an operative to a position of trust and responsibility, and we get it from the standpoint of the actual operation, and then learn to get it from the executive's standpoint; then when one becomes manager, he knows how to look upon all such problems with a broad vision.

And anyone who tries can make the spare hand earn his money at the same time he is learning the trade. We who know the textile industry have to be more or less teachers, not only of the operatives, but of the machinery as well; the machines grow older and need different adjustments to make them perform their best duty. The man who is familiar with new machinery and steps out on a job with old machinery has to do altogether different to get the best results; so he's learning all the time, and why not let the operative also learn to take on the work some day when you are promoted?

Being a spare hand gives the learner a chance to learn the different ways to operate the speeders to get the best results. Operatives do not all operate their frames alike, though they might get the same results, and the spare hand

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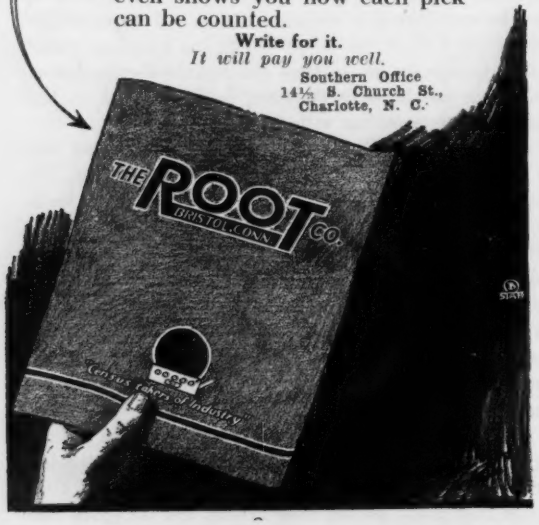

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gets this advantage by working among the different frame hands. It's like trying to live a Christian life, with the different denominations, all are after the same object, but on a different route, and as "Old-Timer" says, it gives them more than one cartridge to shoot, in place of being a one-shooter it causes them to accumulate a number of ways to shoot in operating a frame for the best production, and the more production, the more the operative gets, and the more the mill makes.

Then there is a certain amount of disobedience in most all men, a thing that is inherited from the beginning of time, and when an opportunity arises and a man thinks there is no one to take his job, he sort of gets it into his head to exhibit this inherited disobedience to his foreman, and so lays down on the job; while if there was someone who he knew was ready to take his job he would be more loyal and behave better. This disobedience doesn't get an operative anywhere; it only causes loss of time to himself, because the mill will operate just the same, even if they have to start it over again. It's not the desire of any mill's management for anyone of their help to quit his job. They want all of them to make themselves at home, and the mills of today are making living conditions so much better, and all they can to make the villages cleaner and more desirable for the operatives to live in, that trouble from this cause is being greatly minimized.

Why, I can recall very well when I first went to work in the mill. Our house was a four-roomer, with kitchen, and there were ten children and Dad and Mamma, which made twelve souls to dwell in this five-room house. When a heavy rain would come we had to move our beds about the room to dodge the leaks in the roof. This rocked on for some time and finally it was fixed. But we didn't have any cement sidewalks, mostly trails, and red mud at that. Being on the river, we had quite a lot of showers and muddy feet, which meant muddy floors in the rooms, as the children would not always clean their feet as clean as they should.

Some time ago I went through the old mill village that I went to work in back in February, 1892 (I'll tell my age if I'm not careful). The streets are in order, the houses are painted, the sidewalks are nicely graded and look very desirable, the old trees and hedges that I used to hide behind are cleaned up. I went down to the mill pond gates where, sitting on the gates that we raised up to let the water stream down to the waterwheels of the mill, I recalled one Sunday afternoon, about the time the sun began to sink into the western horizon, when I asked a beautiful girl of twenty summers to share her lot with me. She accepted the proposal and we've been together now for twenty-six years. But I'm getting off my kerzip; that's not mill business. But I just wanted to show that all mill villages are being built up in splendid condition, the environments made better, schools and churches more commodious, and every effort being made in the way of education and learning, which is in line with teaching the operative in the mill.

Pardon just one expression that I heard while I was a roving hand when the regular roving man was out. I was laying up a box of slubber roving on the intermediates and had sort of backed out from behind the intermediates to collect the empty bobbins when I noticed the intermediate operative had the front steel roll lifted up with his left hand, and his right hand was rotating very fast on the indicator clock like an eccentric. Through curiosity I asked, "What are you doing, Dick?" He looked around with a sarcastic grin and said, "Go to hell; I'm winding my traverse." The incident has always been fresh in my mind from that day to this, which shows how improper methods seen by a young person, while his mind is plastic, will stick in his memory. Contributor No. 14.

EDITOR COTTON:

"B. E. (Texas)" asks if spare hands on speeders pay. He must be a new subscriber, for I explained this in my article, "A Mill Experience," published a number of months ago.

I know of a mill in this state that turns off a carding production of 25,000 pounds per week. The management is ever after the superintendent and carder for a possible production of 30,000 pounds. The carding equipment consists of two slubbers, four intermediates, and twelve fine frames. There are only three doffers to do the work of doffing and sweeping. More than one-half the time the tenders have to doff their frames alone, which accounts for the loss in production.

There is a good way to reason it out. If three are unable to handle 25,000 pounds, how in the world is 30,000 pounds possible? See the point? The machinery will turn it off, but after the roving is made the machines must stop for help. Therefore, in this case, at least seven doffers are necessary, and even though their pay will increase the pay roll, it will be found that the cost per pound is greatly reduced by the increased production. Try it.

Wash (R. I.)

Licker-In Speeds and Carding Waste.

EDITOR COTTON:

The object of the licker-in on any cotton card is to disentangle the fibers and convey them to the clyinder without injury. Builders have found that the surface velocity of the cylinder should exceed double the surface speed of the licker-in, or in other words, the cylinder should travel at a surface velocity of 2,200 feet per minute and the licker-in at 1,000 feet per minute. It has been found by many tests that if the licker-in is run at a lower speed that lumps or heavy portions in the sheet of lap would in most cases slow the licker-in almost to a standstill. On the other hand, if the licker-in is run at a higher speed, the stock or a portion of it is taken around a second or more times, which of course injures the stock by repeated treatment.

In the March issue of COTTON, Contributor No. 31 asks if it would be wise to slow down the speed of the licker-in or increase it. The foregoing paragraph answers the question. Lumps are destroyed by the flats, if the flats are set to 10/1000 gauge. There is no combing action from the bite of the feed plate to the surface of the cylinder. Contributor No. 31 is on the wrong side of the card. He should not disturb the licker-in speed, but instead, should run the card at a low speed when running waste, say 10 turns on a 27-inch doffer, have two coilers so the card sliver will not exceed 20 grains to the yard; that is, both slivers weighing 40 grains to the yard. Increase the doubling on the drawing and run the slivers close together so one sliver will be an aid to the other. This will increase the breaking strength. Wash. (R. I.)

The Knit Goods Market.

(*Continued from page* 968.)

erally hold-back attitude, were critical of an advance of 12½ per cent on men's bal briggan shirts and drawers which opened last year at $3.50 a dozen. There was little dissatisfaction with the advance to $3.50 from $3.25, for better grades, and of the latter there was buying in fair volume. The fact that several mills making this class of bals were able to withdraw their lines during the month spoke volumes. At the best, however, buying was spotty, a comparatively few mills taking the bulk of the business that was written, and by no means all of the better class of jobbers showing their hands.

Some jobbers thought they would place no orders until about the beginning of October, reasoning they would be as well able to get goods at that time as in August. Buyers willing to risk waiting were on the bear side of the cotton market, and were in the minority, of course. It was unfortunate that about the time light weights were due there should have been advances in heavy weights, the increases being subsequently marked off. The upward revisions had been inopportunely made.

Ladies' ribbed underwear had been selling before men's lines came out, but in no great volume, and later sales fell off dismally. It is suspected that one explanation for jobber apathy toward ladies' cotton underwear is the prevalent belief it is to a great extent being discarded in favor of silk, and inquiry discloses ground for this view. A cotton underwear manufacturer made an investigation in his household, and found that while his wife and daughter were content with fine cotton garments, his cook and nursemaid wore silk.

At any rate, less cotton underwear for women is being sold, according to factors in the primary markets, and it is not disclosed there has been any diminution in production, except when brought about by force of circumstance, as in the case of a number of Pennsylvania mills, some of which have been idle several months and those which are operating complaining of a dearth of orders. One mill thus far has elected to remain idle rather than proceed to make up goods for orders on its books, uncertain whether some of them will not be cancelled. Some encouragement was received with faint prospect that the threatened strike of the anthracite miners might be averted. Retailers in the mining sections, as well as in the wheat growing sections, are showing little interest in spring underwear, and have yet to receive the great part of their normal fall and winter requirements.

Of several leading mills which have booked phenominal brsiness in men's and boys' cotton ribbed light weight union suits, one is accepting no new accounts, believing its season's production will be no more than necessary for taking care of the needs of last year's customers. All of those who have placed their initial orders are committed for more dozens than they bought a year ago to the corresponding date.

Somewhat of a flurry was created in underwear circles by a drastic reduction in nainsook garments, a manufacturer substituting $6.75 for a price of $8.25. This brings the retail price down to a dollar, from $1.25. All realize the popularity of dollar units.

Reorders for winter underwear are being withheld pending more definite knowledge of conditions among retailers. There have been spurts during which it appeared buyers had come to realize the danger of deferring deliveries until after goods ought to be on retailers' shelves.

August probably was the dullest month of the year in knit goods of every description, and sweater coats appear to have especially suffered from jobber fear of a "hard winter." It will be patent to many distributors before snow flies that what they will have saved in interest on investment in merchandise will be more than offset by loss of sales and lessened profit on higher priced goods.

An industry whose product is closely allied with cotton goods is the fresh-water pearl button industry. The manufacture of pearl buttons from mussel shells was first begun on a commercial scale in this country a little more than thirty years ago. So universal in use has the fresh-water pearl button become and so great is the number of tons of shells taken yearly from Mississippi valley streams that the United States government several years ago took measures to perpetuate the mussel shells and each year it has increased its activities.

Henry O'Malley, commissioner of the Bureau of Fisheries, under whom the work of safeguarding the shell resources of this country is being conducted, recently declared that the fresh-water shell resources of this country are inexhaustible. Mussels live for a time on the gills of fish. Many hundred thousands of fish rescued from slowly drying ponds left by flood waters in the Mississippi valley are being infected with the spawn of mussels before they are tossed back into flowing waters. Mussels are also being grown in troughs under what is known as the "controlled method" for the first time on a large scale this year.

Nearly three billion fresh-water pearl buttons are manufactured in the United States annually. Fresh-water pearl buttons are used extensively on knitted wash garments made from cotton as the weight of the button corresponds closely with the weight of the cotton material, thus preventing any sagging or dragging of the material.

Dust engineering is a comparatively new branch of applied science, the practical object of which is the development of methods, processes and apparatus for the elimination of dust. The Midwest Steel & Supply Company, Inc., 522 Fifth Avenue, New York City, state they are practical dust engineers, and have just issued a booklet descriptive of their Midwest air filters. This is a very comprehensive brochure which outlines the reason for filtration of air and gases in various conditions, and describes and illustrates the line of equipment manufactured by the company for air filtration. One page is devoted to the problems of the textile mill. Copies of the catalog may be secured upon application.

The American Blower Company, Detroit, Mich., have ready for distribution their new general catalog, which has for its purpose to show, in a general way, the various types of equipment manufactured by the company, and to furnish those not acquainted with these products information of a general nature. Detailed bulletins on all equipment shown in the catalog will be sent to those interested, it is stated, and copies of the catalog itself are now available.

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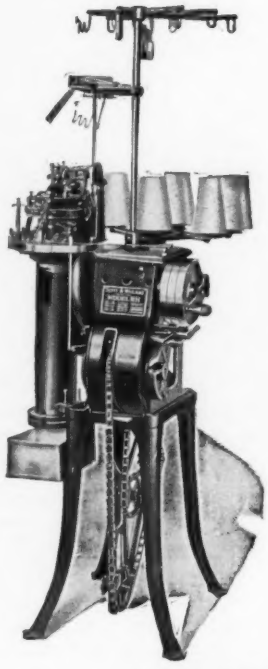

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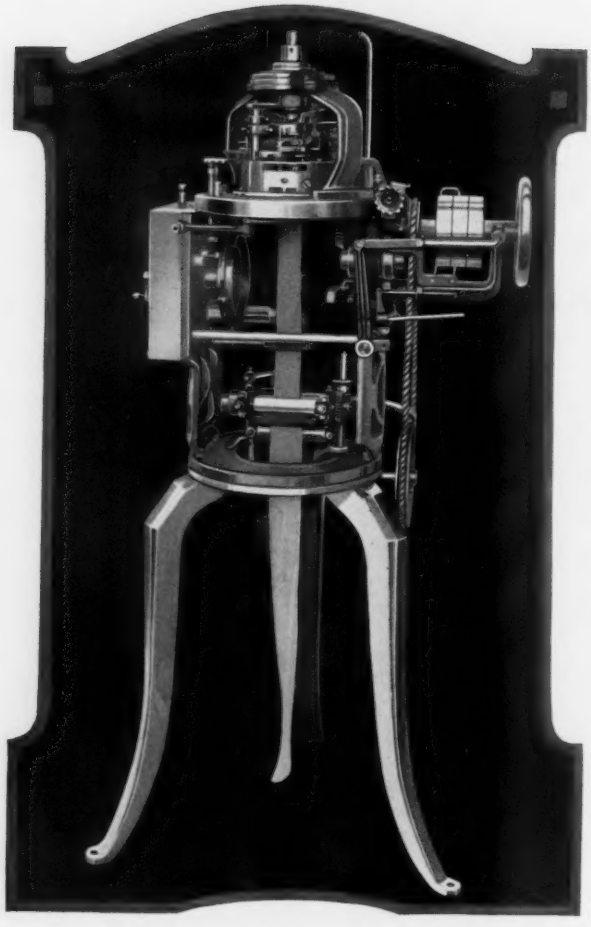

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Imperfections in Knitted Goods

BY WILLIAM DAVIS, M. A.

The catalog of such imperfections as may be found in knitted fabric is a long one and we shall content ourselves with mentioning a few which come into frequent purview in the course of everyday factory experience, and these notes may be of service in elucidating some of the difficulties which puzzle our managers and knitters from day to day, although some of them remain more or less mysterious. Many of these defects are connected with the finishing room, and wherever chemicals such as strong acids and alkalies are employed, their presence frequently gives rise to defects in the goods which are radical in character and difficult to remove afterwards. The key to the situation lies in the strong affinity which the textile fibers have for acids and alkalies and the very decided influence which these agents have upon them. As an explanation of certain phenomena we should constantly keep in mind the effect which alkali has on wool, cotton and silk respectively and the influence which acids have on those various fibers. Knowing these reactions, we should be able to make correct inferences in many cases when damaged goods are in question.

Acids, such as hydrochloric and sulphuric, even in dilute form, have strong disintegrating effect on the vegetable materials of cotton, flax and hemp and finishing processes where these agents are used will tend to weaken these fibers, particularly if the treatment is not succeeded by a thorough rinsing and neutralizing of the materials. If the acid is allowed to settle on the fiber it continues its damaging action after the garment is dry and if such goods are placed in a high temperature the disintegrating action will proceed at a rapid pace and the goods will be tendered.

The writer came across a case of this description quite recently where the material was composed of cotton and wool mixed in the fiber. The fabric had been made into garments which were returned by the customer because they had gone into holes after a short time in use. On examination it was found that the fabric fell apart with the slightest pressure put upon it and the question to decide was whether it was the wool or the cotton element which was becoming tender or both. Investigation showed that in finishing, dilute acid had been employed in one process, and as this had not been neutralized, it continued its action on the cotton fibers, which were found to be devoid of resisting power.

On the side of the animal fibers, it should be kept in mind that alkali quickly weakens such materials as wool, even in a dilute solution, and this action is hastened by a high temperature. If the alkali is allowed to remain on the goods and is not rinsed out or neutralized, it will concentrate on the fiber and weaken or disintegrate it. Such chemical action on the fiber often continues when the goods are in store, although they appear to be all right when packed. This is one of the strongest reasons which manufacturers have for keeping their stocks within reasonable bounds, because storage sometimes causes defects to develop which do not have time to rear their heads if the goods are having a quick sale and pass rapidly from the premises of the manufacturer onto the persons of the wearer.

It is natural that such weaknesses of material should be found most commonly in mixture articles, because in finishing woolen goods we can avoid the alkalies or control them and in finishing cotton goods we may keep a watchful eye on acid influences, but when both those fibers are employed together and have to be put through processes other than ordinary washing, it is then some strong chemical is likely to make its appearance. Silk is very susceptible to hydrochloric acid and will be quickly weakened if carboys containing this acid happen to remain in near proximity to the goods. When vessels containing this acid are opened they leak into the air and the acid which thus escapes quickly seeks out the silk fiber and weakens and tenders it. A defect of this origin is extremely difficult to locate, and the best preventative is to give careful attention to every detail of the factory organization.

Amongst defects included in this catagory the word sulphur is writ large. It is a widespread custom in the trade in woolen underwear to bleach by hanging such goods in the sulphur house, subject to the fumes of burning sulphur. The goods are placed there in a damp condition and as the moisture condenses on the roof, the sulphur constituent gets dissolved in it and these drops fall on the goods, creating stains which are difficult to remove and which adhere with great tenacity to the material. Very often, if the sulphur comes into contact with any nails or metal parts, the sulphur and moisture act on the metal and, dropping onto the goods, have a further constituent in the form of a metal which clings very tenaciously to the garments.

Very often the poles over which the goods are hung are made of wood which, through time, becomes defective and causes holes to be made in the goods as they are removed or pushed along, also the wood absorbs substances dropped from the ceiling or elsewhere and often stain the goods or make dirty lines where the articles have been in contact owing to the presence of dust and dirt. The best material for these rods is glass, which should be carefully wiped and dried before a new lot of goods are hung across them.

The sulphur house method of treating the goods is rather difficult to gauge in its results, and if one period of overhead overnight treatment does not take effect, they are put in for a second time for a further period of bleaching. In such cases the danger is that too much sulphur dioxide has come into contact with the goods and this excess tends to sublime on the fiber and appear in the form of irregular yellow patches on the goods. These defects often do not appear till after they have been in store for some time when they have to be refinished before shipping. It often happens that the stains do not show till the garments have been delivered to the retailer and the spots develop when they are in store on his shelves; in such cases the goods are, as a rule, promptly returned to be refinished. In refinishing, the goods are again scoured lightly and if this scouring brings back the yellow natural pigment of the wool, they may have to be bleached again in the same way.

These yellow sulphur stains are sometimes mistaken for discolored patches which make their appearance on goods

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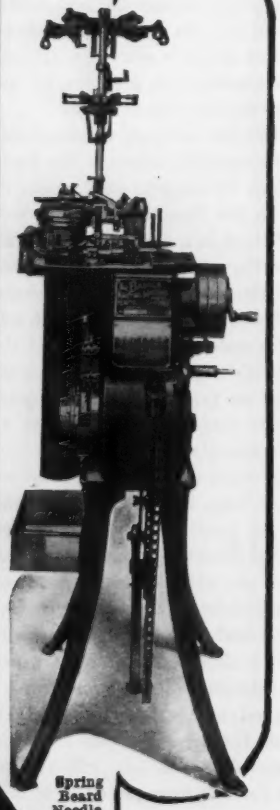

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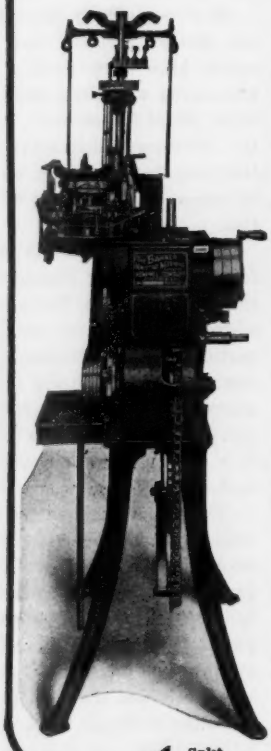

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after being treated in certain processes of finishing, as, for example, the operation of rendering the wool fiber impregnated with acid and immediately immersed in a second bath containing chloride of lime where the effect of the acid is to liberate the chlorine and set it free to act as a dissolvent of the wool scale with which the fiber is covered. Now it is extremely difficult to gauge the degree to which the process has gone and if the chlorine is in excess, if the temperature is too high, or if the substances be not effectively rinsed or neutralized on the fiber ,then discolored yellow or brown stains will appear in irregular patches. While the sublimed sulphur stains may be readily removed by refinishing, it is almost impossible to remedy goods which have gone wrong by treating in this way. The damage is not on the surface but penetrates deeply into the recesses of the fiber and lays the natural raw pigment bare, and that material is appreciably weakened as well as being discolored.

Sulphur has not, on the whole, any injurious action on wool, in fact, there is a certain percentage of sulphur in the composition of this fiber. Such stains may also be found in cases where the treating action has not been performed but where the goods have been subjected to one or another of the bleaching operations, notably by the system of bleaching with sodium peroxide or by the use of hydrogen peroxide. The correct amount of peroxide will not injure the goods, nor is the usual fault that too great a quantity is employed. The explanation is rather that after treating each lot of goods, the substance is not thrown out but retained to use a second time with the addition of some water and a small amount of the peroxide. This may be done several times in succession, thus saving expensive peroxide material; but there is a limit, because if the bath be not regenerated in time, it will go wrong with valuable goods immersed, which are generally affected by appearing a dirty brown, yellow, or some other indescribable tint. These baths should be tested every morning in regard to acidity and alkalinity, and the litmus paper should reveal when they are becoming improverished of any of these agents.

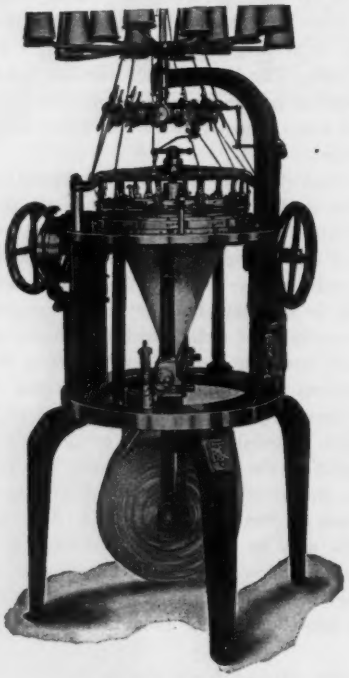
It is a great bugbear of manufacturers to find that large numbers of their garments are returned after a very short period of wear, and they are often at a loss to know what to do about it. In a case which recently came under the notice of the writer, a club chose colors of which maroon and green were the principle stripes employed. It has baffled all their efforts up to the present to obtain a maroon which will not run in washing; it is used along with white and the maroon always bleeds and stains the white in such a serious manner as to spoil the goods completely. Another lot of woolen stockings supplied for football purposes showed that the foot had contracted to about half its usual size in the first or second wash. The tendency was to blame the manufacturer but further investigation revealed the fact that they had recently engaged a new charwoman, who, by her excess of zeal at the wash tub, had made them shrink excessively. A mild reprimand and a lesson on gentler washing action was sufficient to remedy the matter, but not before a number of valuable articles of footwear had been irretrievably ruined.

When small particles of blue or undissolved dyestuff get onto the goods small specks of deep color are visible, which constitute a defect. This very often happens in the process of tinting goods where they are subjected to steeping in an ultra-weak solution of blueing agent, often methyl violet. If small particles of this dyestuff are undissolved, they adhere to the goods and dissolve later in contact with water when they show in the form of tiny circles of color in the goods and create a serious blemish. When the goods are passing through the factory they often catch colored fibers from other lots and thus it is advisable, where possible, to keep the colored and the white goods in separate buildings. This is not always feasible and another method is to erect a partition around the white department so that colored fibers cannot penetrate to where these goods are being worked.

The same class of defect is often to be found in goods which have been worked in dirty rooms where the dirt is removed at irregular intervals and floors swept with the creation of a lot of rising dust. These dust particles, in themselves harmful as they settle on the goods, can generally be removed in scouring, but they often contain metal filings or fine particles of metal which are quickly affected when the goods come into contact with strong chemicals in the subsequent operations. These particles are the cause of the very tiny holes sometimes found on knitted goods where the material is dissolved or corroded sharply at a given point in the fabric. They may be unobserved for some time, but after a short period of wear they break into holes which shorten the effective life of the garment. Similar results may be produced by pulling the articles along the floor or allowing them to fall, for in this way many of these foreign bodies may adhere to the garments and show at some subsequent time in a rather puzzling manner.

It is very difficult to explain some of the flaws found in goods returned as defective by the wearer, these having often been marketed under a guarantee that if they shrink they will be replaced, or if they go into holes in a given period they will similarly be made good. Very curious stories are in circulation regarding guaranteed goods, for in this way it is possible for the unscrupulous to take advantage of the manufacturer. Cases are not infrequent where wearers prey on firms who guarantee their goods by always returning them when worn and getting a new article under the pretext that it has not come up to the guarantee. Omitting those cases, however, there are always a certain number where the customers are well known and the facts verified that the garment has not given reasonable satisfaction in wear, and if those articles are of the more expensive kind, the seller is under an obligation to the customer to meet the case.

A number of such cases have come under the observation of the writer and in several the damaged or weak part can be attributed to the effect of perspiration on the goods. Some wearers, particularly those with a given kind of perspiration, can bring the color out of a garment very quickly, and this is attributed to the peculiar chemical composition of the perspiration. Similarly, certain varieties of perspiration cause goods which are a perfectly satisfactory white to become discolored and tinged with yellow. This certainly is the cause of the great majority of garments being returned as showing excessive shrinkage, for certain kinds of perspiration, exuded under conditions of rigorous bodily exercise, particularly affect the white tint



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For many years we have been equipped with special dividing heads from which we have manufactured Index Plates unsurpassed for accuracy.

The Cylinders and Dials resulting from such superior methods are then hardened and scientifically tested.

This careful procedure guarantees a precision and durability resulting in the consistent production of faultless even fabric.

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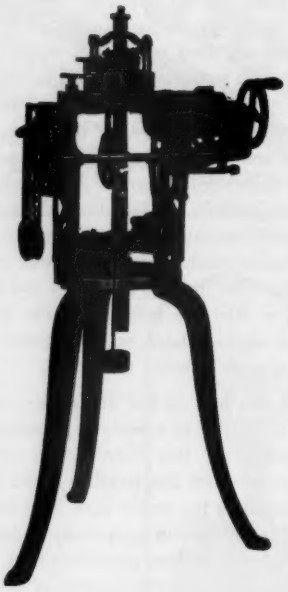

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possess all modern improvements, including selvage welt, French welt, double knee dogless and striping attachments, with automatic stop motions.

Built in all sizes for all classes of rib work.

We also build hosiery knitters and Body machines for underwear and various other circular machines for all kinds of knitted articles.

Samples and prices on request

H. BRINTON COMPANY
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and also cause a very rapid shrinkage of the material. A similar set of conditions are responsible for fading of certain dyes on the garments, for certain varieties of sweat bring out the color quickly and we often find that points which come into direct contact with the hands or the limbs show a distinct fading action due to this cause.

Reference has already been made to the powerful action of sulphur, but a very curious case was noticed recently where a certain lot of goods had been shipped to a distant port, requiring about two weeks in transit on salt water on board ship. The goods consisted of sulphur bleached underwear and brown dyed shirts, and arriving in the customers hands a very distinct fading of the brown color was noticeable at certain points. An explanation was vouchsafed on the basis of the fading action of light, but it was clearly proved that the goods had been packed tightly all the time and had been deprived of light of any description. The explanation was found in the method of packing the goods for shipment, for it was seen that, although the sulphur bleached goods had been placed in separate parcels, yet the packages containing the colored goods had come into contact with them and the sulphur influence had penetrated through the paper packing and had faded the color, making it appear in lighter patches of brown where the sulphur had had the most direct access. Similar discoloring of goods may often be noticed in storage, particularly at the edges of parcels, the light penetrates most easily at these edges and takes the color out of dyed goods, while it also affects the quality of the white in white goods, causing it to be duller at the edges so as to necessitate bleaching afresh.

But the influence of strong chemicals may also be shown over a certain space, even extending from one side of the room to another in the same building. The most famous example of this is the pink coloration, which often appears on white bleached goods made from cotton. This has been proved to be due to the influence of storing black dyed stockings in the same room with the white goods,; in dyeing such blacks aniline oil is generally employed and it is the strong pungency of this substance permeating the room which influences the shade of the white to such an extent as to make pink spots appear.

It is well known that goods to be worn at the seaside and exposed to the influence of the sea breezes and salt water, require to have specially fast qualities if they are not to be seriously influenced with these agents. During transport on board ship, goods are, for the most part, well protected, but if by any chance a storm arises and the salt water penetrates to the goods, the color will be affected as a result.

While access to light and ventilation may have an influence on the purity of shade, storing in dark cellars gives rise to another defect, that of mildew on cotton and wool goods. The proper medium for the culture of such bacteria is a damp warm atmosphere which is often found in the lower basements of many factories. These fungi, as they are called, develop most readily on fibers such as flax and hemp (it will be remembered that flax encourages bacterial action in retting by which it becomes possible to separate the pith from the flax fibers so that the latter are secured ready for spinning). It would seem that this action can be re-commenced with facility whenever the correct conditions are reproduced. Moths also are a considerable trouble in some localities, and these can be encouraged if care be not taken to keep clothing which has been worn separate from clean clothing. Perspiration appears to attract these insects and once they are introduced into a wardrobe, they breed rapidly and soon burrow their way into the garments. When the moth caterpillars hatch they eat their way all along the surface of a fabric, devouring the loosely hanging surface fiber, and from this they penetrate more and more deeply into the cloth until it is completely eaten through. Attention has been given recently to treatment of woolen fabrics which will act as preventative of moths, but these systems do not seem to have found general acceptance owing to their cost.

Among the Knitting Mills.

Richmond Hosiery Mills, Rossville, Ga., are erecting 25 houses for the use of employees. An additional tract of land has been purchased which may be used for future additional houses.

Mohawk Hosiery Mills, Burlington, N. C., have nearly completed their new plant, and will soon begin production. The equipment includes 38 knitting machines, 8 loopers, with electric drive.

A $25,000 addition will be erected by the Princeton Hosiery Mills, Princeton, Ky., and several thousand dollars will be expended for new machinery and a water softening plant.

Avalon Hosiery Mills, Elizabeth City, N. C., which have been idle for nearly three years, have recommenced operations with a capacity of 500 dozen pairs of hose a day.

Carlyn Hosiery Mills, 404 W. Baltimore St., Baltimore, Maryland, have been organized with a capital of $50,000.

Harry Landa, president of the Landa Milling Co., New Braunfels, Texas, is to organize and operate a hosiery plant.

Elaine Knitting Mills, Inc., 93 Prince St., New York City, have been established for the manufacture of infants' and children's knitted specialties.

Apalache Hosiery Mill, Landrum, S. C., has been incorporated by Joseph Lee, J. G. Landrum and J. H. Williams.

Grantville (Ga.) Hosiery Mills are erecting an addition to the warehouse.

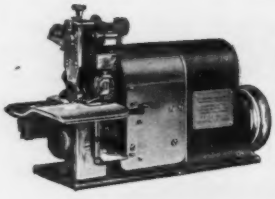
The Thieme Brothers Co., Fort Wayne, Ind., has construction work under way on a new boiler plant and dye house, at its knitting mills, to cost in excess of $50,000.

The Marlowe Mills, New York, N. Y., recently organized with a capital of $10,000, have plans under way for the establishment of a local mill for the manufacture of knit underwear and kindred products. I. H. Schwartz and M. Hetterich head the company. It is represented by Goodman & Werner, 51 Chambers Street, New York.

The plant of the Grand Rapids (Mich.) Knitting Mills, Inc., manufacturers of knit underwear, etc., has been appraised. The company recently filed schedules in bankruptcy.

The Colonial Knitting Mills, Inc., Philadelphia, Pa., have awarded a general building contract for the erection of its new three-story plant building, including boiler house, dye department, etc., to be located at Clearfield and B Streets, estimated to cost about $250,000, including equipment.

MERROWING



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The Merrow High Speed Overseaming Overedging and Shell Stitch Machines.

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IT MEANS: MAXIMUM PRODUCTION
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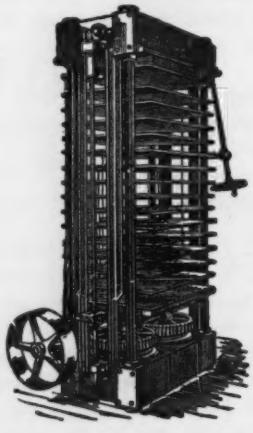

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FOR
Hosiery and Underwear
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Reliance Machine Works
FRANKFORD, PHILA.

JOSEPH T. PEARSON & SONS CO.
MANUFACTURERS OF
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HOSIERY FINISHING BOARDS
THAT WORK ABSOLUTELY SMOOTH
PROMPT SERVICE—RIGHT PRICES
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GENERAL MACHINE WORKS
YORK, PA.
Manufacturers of
Circular Rib Knitting Machinery
Cylinders and Dials

The Kiddie Klub Knit Wear, New York, N. Y., recently incorporated with a capital of $100,000, will operate a local mill for the production of its regular line of children's wear. The company is headed by J. Leibner and M. Hirsch; and is represented by H. Z. Eothstein, 1400 Fifth Avenue, New York.

The Bordeaux Knit Wear Mills, New York, N. Y., will operate a local plant for the production of its regular line of knitwear specialties. The company was recently incorporated with capital of $50,000; headed by M. H. and H. and N. P. Guttman. It is represented by H. Silverman, 299 Broadway, New York.

The Rathbun Knitting Co., Woonsocket, R. I., has work under way on a one-story addition at its mill on North Main Street, 38 x 44 feet. Knight C. Richmond, Providence, R. I., is engineer.

The Greenwich Fabrics Corporation, 229 Fourth Avenue, New York, N. Y., has arranged for an increase in capital to $100,000, for general expansion.

The Century Knitting Mill, Hazleton, Pa., is operating at full capacity, with large orders on hand. Employees at the mill recently had a two-weeks vacation, during which time repairs and improvements were made in the plant.

The Brilliant Knitting Mills, New York, N. Y., recently organized with a capital of $10,000, have perfected plans for the operation of a local mill for its regular line of knit goods products. The company is headed by W. L. Brilliant and H. L. Greene; it is represented by Dolby & Greene, 16 Exchange Place, New York.

The Alliance Knitting Mills, Inc., Whitesboro, N. Y., recently organized, has acquired the local plant of Charles A. Powell, heretofore operated under the name of the Alliance Knitting Mills, for a consideration stated as $289,000. The new company plans to expand the business.

Do We Want the Truth?

Do we really want the truth, the whole truth and nothing but the truth? Emphatically no.

Willie Collier once appeared in a play entitled "Nothing but the Truth." As we recall it the hero, appreciating the amount of falsehood there was in the world, determined to tell the exact truth at all times in the hope, if not expectation, of bringing people to abandon their sinful practice. One of his young and charming lady friends came on the stage radiantly happy.

"What do you think of my hat?" she asked, turning this way and that so he could see it in all its stylish glory. He looked at it critically.

"It's perfectly hideous," he told her. "Its shape is unbecoming to you, wholly unbecoming. The combination of colors is atrocious."

Now, what he said about that hat was true as he saw it, but when the girl realized that he was in earnest and meant what he said, she let out a scream that, figuratively, raised the roof, and then, of course, did a perfectly ladylike thing. She fainted.

Did that experience daunt the young apostle of truth? It did not. He told the truth, the unqualified, unpleasant truth about men, women and things, and it came to pass that lifelong friends not only deserted him but became his enemies, strangers who heard the tales told about him wondered if he was all right in the head, persons who had thought well of him turned the other way at sight of him, and eventually he became a pariah.

There is one thing in life almost as precious as life itself. That is our illusions. If we had nothing but the truth we would have no illusions. Heaven with its pearly gates and marble halls is one of our classic illusions.

The Declaration of Independence itself is not the truth. Read the second paragraph. It says that all men are created equal. Nonsense. Is the Eskimo or the head hunter of Borneo or the Negro of Central Africa born equal to the son of the King of England or our own John D.? You know he isn't, but that paragraph is going to stay in the Declaration. It is one of our pet illusions, has been for nearly a century and a half and will remain so for—who knows how many centuries to come?

All this is a prelude to a recital of what is agitating some gentlemen in Washington and some other gentlemen who happen to be interested in textiles.

Complaint was made to the Federal Trade Commission that a cotton fabric was being sold under the name of cotton pongee. The Silk Association of America directly and Cheney Bros. indirectly protested that to call it cotton pongee was unfair trade practice.

The term cotton pongee has been in common use for 20 years or more as applied to both cotton and cotton and silk fabrics, but the contention of the complaints is that pongee is a silk term generically and is misused, if not deceptive, when applied to other than silk goods regardless of the fact that for every yard of silk pongee manufactured a thousand yards of cotton pongees are made.

But if we are to have absolute truth in fabric we will have no more cotton pongee or cotton and silk pongee.

Suppose the Federal Trade Commission decides that the term pongee can be employed only when the goods are wholly of silk! What will be the result? It would seem that the makers of cotton pongees would have to start all over again under another name, for their product and the scarcity of silk pongee will be so great as to send its price kiting.

As to the relative merits of silk pongee and cotton pongee and the combination of silk and cotton pongee we are wholly ignorant, but it would appear from the evidence that to the public today cotton pongee is pongee made so by trade usage of many years.

The Federal Trade Commission has been a stickler for truth. It probably will decide that pongee is silk and that henceforth and forever and ever it will be a crime to sell cotton pongee or cotton and silk pongee under the sacred name of pongee. Let us hope so, but with this reservation. If we are to have the truth, the whole truth and nothing but the truth let the decision be that pongee be sold and described for what it is and not for what it would appear to be if classed as silk.

If you look on page 1011 of Webster's Unabridged Dictionary you will find, near the bottom of the middle column:

"Pon-gee, n. An inferior kind of India silk."

If pongee is to be sold as silk let it be known to the world that it is an inferior India silk.

If we are to have nothing but the truth let us have the whole truth.

But, alas, how unhappy that would make us. Witness

the instance in Willie Collier's play. And remember what the Quaker said to his wife: "Everybody is queer but me and thee, and sometimes, Cynthia, thou art peculiar."

Montaigne was right. Truth has not the privilege of being spoken at all times.—*Richard Spillane, in Commerce and Finance.*

The Yarn Market

Undoubtedly the passing of the merry month of July this year sent none of the Philadelphia yarn market factors, or the spinners of the yarn, to the mourners' bench. Rather they were gleeful at its departure, because it managed to continue, throughout its duration, the existing pall of a dull market and reducing prices that had obtained in the market for four or five months previous. Price reductions that affected most of the numbers in the list brought the total loss in market value for the period from March through July to from seven to eighteen cents per pound, and July's contribution to this reduction was anywhere from three to eight cents.

Market conditions during the latter part of July were, like the weather, uncomfortable. On one day, the 23rd, the major portion of the list lost a cent a pound, which was a typical instance, being caused this time by a break in cotton, and which, in one case at least, brought the value of the count to its lowest level since October of 1922. Price was the determining factor in what transactions were conducted, and difference of opinion on this point prevented several transactions that would have involved substantial quantities of carded and combed yarns.

Comparisons, in cases like this, are illustrative if odious. Taking 30s/2 carded warps as a typical count, during the last week in July this yarn was selling at—was quoted at, to be more exact—a price which was three-fourths of the rate at which it passed through the market on the day the business year of 1923 became a reality, and this price at the end of the seventh month represented two-thirds of the peak price which was achieved in the month of March.

That indicates the position of the market as it was turned over to August. Other comparisons, however, were not so definite. It was truthfully pointed out that prices represented a level approximately that of the same period last year—but that last year, good business was being had by yarn makers and dealers.

Quite correct, but it must also be recalled that July-August, 1922, was a good time for yarn consumers, with prospects for the more or less immediate future equally as good if not better, and that it was a reflection of this condition that provided the yarn market with better activity. Scanning down the calendar a twelve-month, July this year found conditions practically reversed in the yarn consuming trade and the effect of this was felt in the yarn market just as was the effect of better times. Yarn consumers were apparently indifferent as to buying yarns so long as they had nothing to do with them other than store them and so were, during July, infrequent callers at the yarn market.

August and the Government's crop report brought a ray of hope and light—and some business. Higher cotton prices resulting from the crop report were immediately reflected in better yarn prices, and this boost started yarn prices on an upward slant which was continuing with apparently increasing vigor at the time this was written. Yarn dealers tried it first, as an "experiment," it was called, "just to see what would happen." There was no reaction that was opposed to it—consumers who wanted their yarns for filling orders bought them at the elevated level—and as cotton gained so did yarns. Then, too, there were some dealers to whom the report imparted a desire to get on the long side of the market, and they went to the mills for consignments of yarn that. in the aggregate, assumed rather encouraging proportions. A slight indication of a better general feeling also attributed some toward strengthening the situation.

Then as yarn prices were raised and stuck, spinners became more interested and appeared to exercise more activity. On the lower level and with the apathetic market conditions, some extensive curtailment and lack of selling campaigns obtained. With better prices, visits to the market on the part of spinners were more frequent and general, and they came after business. Another fact was that during August several yarn consumers, who have in the past represented the trend of yarn buying, came into the market for some nice orders, and it seemed that once more the market was moving forward to a better condition. More buying has been anticipated for fall, and the present reawakening seems a forerunner of good business which is generally looked for after Labor Day has come and gone.

Quotations reported for the Philadelphia market on August 17 follow:

Single Skeins.

4s to 8s	35½	10s	37½
12s	38½	14s	39
16s	39½	20s	40
24s	43	26s	44

Single Warp.

8s	36	10s	38
12s	39	14s	39½
16s	40	20s	40½
26s	45	30s	47
40s	55 @56		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slacks	38 @39
8 3-4 tinged tubes	34 @35
8 3-4 hard white warp-twist	36½ @37
8 3-4 hard twist waste	33 @34

Two-Ply Skeins.

8s	36	10s	37½
12s	38½	14s	39
16s	40	20s	41
24s	44½	26s	45
30s	47	40s	55 @56

Two-Ply Warps.

8s	38	10s	39
12s	40	14s	40½
16s	41	20s	42
24s	45	26s	45½ @46
30s	48	40s	56 @57

Frame Spun Carded Yarn on Cones.

8s	37½	10s	38½
12s	39	14s	39½
16s	40½	18s	41
20s	41½	22s	41½ @42
24s	42½ @43	26s	43½ @44
30s	45½	40s	55
30s double carded			47
30s tying-in			42

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	50	20s	52½
24s	53	30s	60
40s	68	50s	73
60s	80	70s	90
80s	$1.00		

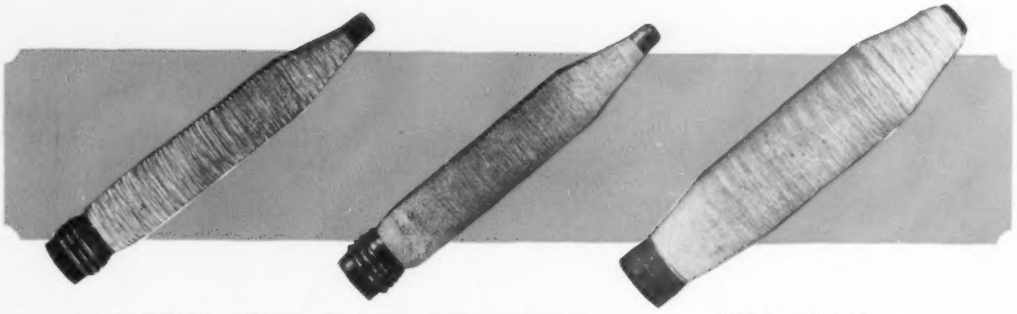
Mule Spun Carded Yarn on Cones.

10s	42	12s	42½
14s	43	16s	43½
18s	44	20s	46
24s	48	26s	50
30s	53	40s	63

Mule Spun Combed Peeler Yarn on Cones.

10s	50	12s	51
14s	52	16s	53
18s	54	20s	55
22s	56	26s	62
28s	63	30s	64
36s	66	38s	72
40s	73		

Don't spin filling to fit a Hole in a Piece of Wood



Spun with 1⅜″ Ring fo Shuttle.

This Universal wound bobbin contains the amount of filling spun with 2″ ring. It has been inspected and perfected to reduce costs and protect values in weaving.

Spun with 2″ Ring for Winding.

Spin to Spinning Limitations Rather than to Shuttle Capacity

Spin Warp and Filling Yarns with same size ring, warp bobbin filling built. Gain flexibility of spinning equipment and save doffing time and labor costs.

With a large spun supply labor cost of filling preparation is cut in half, therefore why not treat the filling as fairly as you treat the warp, save filling waste, increase loom efficiency, reduce cost of weaving per cut, make jobs more attractive to operatives and improve qualities for resultant savings in cloth department?

In every instance the total saving has exceeded the cost of preparations

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Ask the Machine Builder

Nine out of ten of the knitting machines built in this country are equipped with Torrington–Excelsior Needles.

The unvarying uniformity of the needles necessary to the smooth operation of a new machine is equally important in a machine that has seen service.

You can secure "machine builders quality" needles for *either* new or old machines by specifying Torrington–Excelsior, for these needles are made in one quality only.

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The Knit Goods Market

A manifest determination on the part of knit goods distributors to keep stocks at a minimum in preparation for the end-of-the-year inventories was indicated in the restricted operations in the primary market throughout August. Whether buyers lack spunk or are to be accredited with resorting to becoming conservatism makes little difference so far as unsatisfactory conditions among mills is concerned. It is sufficient to say that while there was no evidence of curtailed buying by the consuming public, dealers in knitted goods operated as though they feared the public was not to be trusted as a continued good customer.

Fear dominated the market, and that emotion seemed to become more pronounced the more cotton wobbled and silk fluctuated, while wool and worsted yarns appeared to be seeking lower price levels. Except in spots, there was no spirited buying of underwear for next spring, despite the fact low prices had been named and that by the end of August jobbers ordinarily would have provided for a great part of their early 1924 requirements. Some duplicate business in hosiery for Fall trickled through and a comparatively few buyers placed spring orders for cheap cotton hosiery. September dawned with much of hosiery for fall and winter yet to be contracted for.

The August lull was not entirely unheralded, for as early as June and throughout July there was a falling off in new business, unfilled orders were shrinking in volume and production declining. Department of Commerce figures issued about the middle of August showed that in 318 establishments reporting there were produced in June more than 200,000 less dozen pairs of hosiery than in May. This showing is, in a way, supported by figures from a group of representative mills reporting a decline in June production of 18 per cent compared with May. These mills had on June 1 unfilled orders for approximately one-half as many dozens as on the first of May, and the first of July showed a more serious shrinkage. If reports of jobber ultra-conservatism needed confirmation, it was supplied in statistics from more than 400 manufacturers.

Curtailment at mills was forced by distributors. As there had been too much of canceling—amounting to about 10 per cent of the orders received—it was not to be expected that manufacturers would make up goods for stock. Reports indicate they went no further than to put into finished goods the yarns in stock. There was little buying of yarn except to cover for orders on the books. In fact, New York representatives of some mills counselled a shutting down, and where mills were idle advised that operations be not resumed until absolutely necessary for filling orders then in hand. It was reasoned by the cautious New Yorkers that any decline in the raw materials markets would be followed by more cancellations and that therefore it would be expedient to defer completing orders until about the time of delivery. It was a trying situation for mill and jobber. With August admittedly a critical month for cotton to buy or not to buy was simply a question of speculation. Jobbers took the safe ground and put the gamble up to manufacturers with a bare possibility of hearing lower prices and mindful of such a contingency as would compel them to pay advances.

In a general way buy as needed for immediate use was the policy of distributors and it appears this policy will be adhered to throughout the remainder of the year. Enormous business for the American Railways Express Company is foreseen as buying is being so long deferred that there is certain to come a time when merchants will not be willing to wait for goods to be shipped by freight. Only several weeks ago the Burson Knitting Co., a day after shipping fifteen cases of hosiery by freight, was instructed to increase the order by one case of each of the several numbers and forward by express at once. "We cannot wait for freight trains," the jobber wrote. This is by no means an isolated case.

In view of the low prices forced on mills by the average buyer, it is intimated that when competition for deliveries sets in, as seems almost certain, manufacturers will be likely to exact figures more nearly representative of value. They can be no more blamed for turning the tables than are buyers for taking advantage of a market in their favor. There will be goods aplenty, but perhaps not available in quantities desired when most wanted.

There has been a slowing down of mill operation, especially so in Philadelphia and Reading. In the latter city manufacturers were really busy until a month ago. Now some are running their plants but four days a week, rather than operate full time with only part of the operatives. The situation in Philadelphia is not unlike that in Reading, and scattered reports are to the effect that mills elsewhere are having considerably less than capacity output. One mill has all of its full fashioned machines under blankets for an indefinite period.

From the mill standpoint, business in full fashioned silk hosiery has been far from satisfactory, due in part to increasing potential production faster than the gain in actual consumption. One effect of this was to keep prices so low as to make the full fashioned a more ready competitor of the circular knit or so-called seamless. Excess production, therefore, has not been an unmixed evil, and in the belief that with lower cost of raw silk full fashioned will make still greater strides toward popularity, there is continued installation of flat machines, the trend running toward the finer gauges, with the likelihood that 42 gauge will take the place of 39 to a very great extent.

The closest competitor of the full fashioned all-silk boot stocking is tram and artificial silk in combination knitted on circular machines, jobbers leaning toward the spring needle goods in ladies hose and the split foot sock for men. When it comes to chiffons, the preference is for the full fashioned, and some interests now regard the sheer stocking knitted on flat machines almost as staple as the 10 to 12 thread has been for some years.

Chiffons have been bought in right good volume for fall. Some persons say they are more comfortable in cold weather than in summer. They are an accompaniment of the longer skirt for winter wear it is believed among persons who make a study of style and the whims of women. And this keeps alive the question whether ladies' wool hosiery will be popular a few months hence.

At this writing wool hosiery for women is a dubious proposition. Some jobbers placed their initial orders during August. So far as could be ascertained, none bought more than enough for a short tryout. A fair sized house

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thought two cases would be sufficient, and that was all for which it would commit itself.

Most manufacturers, eager to sell what they have in stock, would hesitate to make up wool or silk-and-wool on order for late fall deliveries. There is fear that in the event of a prospective style change the goods would be thrown back on their hands. Another factor in the prevailing fear is the unsteadiness in worsted yarns, of which, it was believed in August, there were some accumulations, as not a few manufacturers were withholding specifications from spinners.

Stockings to retail at two dollars and less a pair will be the better sellers, distributors say, and their purchases have been on that basis. Some of the larger department stores are known to have carried considerable high price silk-and-wool hosiery over from last winter. Much of this was made in England. Some of it is liable to be offered at greatly reduced prices, which, obviously, would interfere with the sale of the lower priced domestic goods at value.

Half hose of wool in mixture is conceded to be good merchandise. It will be worn next winter more extensively than last winter, is the belief in the trade, and buying, which began early, has been on a fairly liberal basis. In the better grades, plaids, it seems, will be the rage. In any event, men are running toward fancies since there is more general wearing of low shoes during the cold months, as a matter both of comfort and expedience. Their use as an all-year-around article of footwear enables many a man to defer his purchase of a new pair with the beginning of each season. This may not be so good for the shoe business, but it helps hosiery.

One effect of curtailed production was manifest in fair demand and comparatively steady prices for low end cotton half hose. There has been some big selling of 176 needle socks at $1.05 to $1.07½ a dozen, and the Durham Hosiery Company, which made a drive at the latter price, is understood to have sold well ahead for October deliveries. Another southern mill, after taking orders for about 7,000 dozens at $1.05—some for December delivery and some for delivery early next year—authorized its New York agent to offer a like quantity at the same price. This was prior to the advance in cotton following the August government report of conditions in July. The prices mentioned were for full seamless goods, sewed toe being quoted at a nickel a dozen less. A few manufacturers have been holding for $1.10 for looped toe goods weighing 18 ounces.

A Montreal buyer, who was in the market for 176 needle goods, complained mills were less inclined to shade prices. This was true, to a great extent. Output had been reduced after the low end socks for a time had suffered from excess production.

Automatic top 176 needle half hose was offered quite freely at 75 cents a dozen. The lowest heard for 144 needle goods was 85 cents, whether for sewed toe was not stated. Women's 176 needle goods got down during the quiet market to 95 cents and were in no extraordinary demand at that figure.

Mercerized hosiery has been in only light demand, but toward the end of August manufacturers were in the market for mercerized yarn, leaving the impression some business for spring was in sight. It was understood that the line of ladies' mercerized of one large mill was to come on the market for spring at $2.12½ a dozen for single seam, presumably as a leader. It cannot be stated definitely that any business was booked at that price, which is 12½ cents under the quotation of a commission house for mock fashioned. There was so wide a variance in prices for standard goods that it must be apparent there is no established value. The same is true of mercerized half hose. There had been an almost uninterrupted falling off in the production of men's and women's mercerized hosiery since February, as shown in statistics from manufacturers.

Hosiery of tram and artificial silk, plated and in twist, continues a favorite, because of price; a lady's stocking of that mixture to retail at a dollar a pair being a very popular number from latch needle machines. Spring needle goods are in better call and bring somewhat higher prices, up to $1.50 a pair. The circular knitted of this fabric has proved a formidable competitor of full fashioned silk goods, for both men and women. Gallagher & Thompson had volume business in ladies' tram and fiber in twist at $5.85 a dozen, for 240 needle, 20-inch boot. This was the lowest price heard last month for hosiery in this class, priced ordinarily during August at $6.75 to $7.25.

Men's fiber and silk socks were available at $3.65 from one important mill, and fiber and mercerized at $3.50. Primary market operators say there is but slight demand for women's hosiery of fiber plated on mercerized, and this would seem to be supported by the fact an all-around drop stitch is not finding a good market at $4.50, although an exceptionally good appearing piece of goods. Men take more kindly to the combination.

A mill in Reading, Pa., is quoting $6.50 a dozen for 12 thread split sole silk half hose, this being the price to jobbers, who, however, are offering one mill line of full fashioned silk socks at $8.25. The latter are supposed to sell at a dollar a pair. It is not improbable more of the circular knit than of the full fashioned will go over the counter at that figure, as retailers strenuously object to paying more than eight dollars a dozen for a stocking to sell at a dollar a pair. The circular knit, at $6.50, is as good appearing a sock as the fashioned, of lighter fabric.

Men are less willing to pay a dollar than are women to part with two dollars for a pair of silk stockings, it is stated by retailers not in the department store class, and they find a good outlet for a split foot silk sock, 240 needles, sold to jobbers at $5 a dozen and presumed to go over the retail counter at seventy-five cents. One manufacturer offered a limited quantity of this class of sock at $4.85 for immediate delivery, and was not eager for business at any price for distant deliveries, fearful that orders placed at this time might not stick to delivery time, unless there be an unexpected advance in raw silk.

Probably the more nearly stabilized line of hosiery is combed goods for men. A mill whose lines are well established among jobbers is selling for fall and spring at $1.75 a dozen for 220 needle, double sole and high spliced heel, and is guaranteeing its price against its own declines. On the basis on which price was figured, it is stated, there will be no downward revision unless cotton drops to below 20 cents. A mill which not so long ago engaged in the manufacture of combed half hose is quoting $1.65 for 200 needle, double sole and high spliced heel. Combed goods have held their own against mercerized notwithstanding low prices of the latter on goods of 200 needles and a class with plain cotton tops.

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The unsettled cotton yarn market enabled several manufacturers to put a very low price on misses' combed ribs for spring, a quotation of $1.65 on size 7, rise 7½ and fall five cents, leading the procession. That was about the price a year ago, when southern combed peeler was quoted at around the mid-August figure. Combed peeler 18s were bought by at least one manufacturer early in August at 45½ cents, which was about five cents under the high quotation submitted at the time. Subsequently, however, it is stated, a lot was picked up at 44, in competition with an admittedly better yarn for which the spinner was asking 46. At the present price of $1.65 it is within the range of possibilities that advances will be announced before buying for spring has been completed, it being doubtful, it is held in the trade, whether future purchases of yarn can be made as advantageously as in the last month.

Misses' coarse gauge ribs, at a dollar a dozen on size seven are rated priced too low for standard goods. This, however, is the quotation of one of the larger selling establishments in New York, while some mills are adhering to $1.05, rise and fall five cents.

There has been considerable looking around in the primary market for misses' fancy top ribs for spring, and it is understood several exclusive patterns from a Philadelphia mill have been bought in reasonable quantity by a few jobbers. This particular line is selling on the hit it made during the current season, and, it is promised, some new designs will make their appearance by the time spring buying is well underway.

Notwithstanding sad experiences with many of the novelties in hosiery, there still are bountiful crops of innovations. One of the new things shown last month was random cotton half hose. It is of carded yarn and designed to sell to jobbers at $1.45 a dozen. It looks like a winner and has attracted no little attention. The random effect was supplied by a Georgia spinner, and is said to be produced by a somewhat new process. In a way, it is a reproduction of random underwear fabric.

A novelty that, because of the high cost, may not have easy sailing, is a ladies' full fashioned lisle stocking, made in Germany, in gingham check and shades. It is being tried out at around $18 a dozen to jobbers, in the expectation retailers could get three dollars a pair. As a sports stocking it ought to find a good market at a lower price than has been put on it. While striking and attractive, the stocking is an improvement over the flashy and giddy.

And there has come on the market what are described as "Invisible" and "Rabbit's Hair" stockings for ladies, designed to be worn under silk chiffons in winter. The invisible is appropriately described by the name given to it, and might not be tolerated on the beaches where bare limbs are taboo. Some one has evolved a sheer cotton stocking, and chiffons of mercerized yarn are suggested by one well known primary market operator. As at present advised, he says, he would use English yarn until American spinners bring out a very fine count in hard twist adapted to the purpose.

Something distinctly new, in the matter of price, is a ladies' 260 needle all-fiber boot stocking, made on Pigeon machines, at $5.75 a dozen. It is of 22-inch boot, made from 80 denier stock. An equally spectacular price is $6.87½ for a ladies' 260 needle silk-and-fiber stocking with pointed heel, conforming to the Pointex—and the heel is not sewed in.

Conspicuous among the low price hosiery lines are infants' cotton socks, offered by a commission house at 75 cents for sewed toe, and 92½ for looped. The same establishment is taking orders to April for a line of infants' full mercerized striped turnover tops with heel and toe in colors at $1.40. The same line in solid colors is quoted at $1.32½. These prices came out at a time when the infants' sock market was in a state of confusion over the attitude of buyers and a reported shading of prices by several mills when the goods failed to move freely at and immediately following the opening.

The opening of sock lines for next spring now appears to have been not well timed. Samples first were shown when all interests were doubtful of the market future. Jobbers were not ready to buy. This fact dawned on selling agents on their first trip out with samples. Then began the usual competition for business, with about the same result that followed last year's unsatisfactory opening. However, buyers eventually did some contracting, and two mills with somewhat distinctive lines are understood to have booked a fair volume of orders. About the time it looked as though the market was on the way to recovery from the confusion which had prevailed for about six weeks, manufacturers of low price lines, which had not been moving, announced still lower figures, and there were more wrinkles to be ironed out.

A well known mill, which last year to the middle of August had sold its production, had 40 per cent remaining unsold to the corresponding date this year. Some have not done quite so well. From now on, however, there will be comparative steadiness of prices, and it is thought the bulk of the buying will be completed by October. By that time jobbers will have been able to appraise the value of the retailer orders on their books.

There has been considerable doubt about retailer orders sticking. Requests for deferred deliveries were frequent, and these were passed along to manufacturers by jobbers. Then, too, it was stated, many of the small to average retailers were not prompt in taking care of their June-July maturities. Collections have not been satisfactory, and this is one reason for asking for deferred shipments. There was little disposition among jobbers to buy goods for retailers in arrears. One rather important jobbing house, asking that deliveries be deferred indefinitely, said: "While we are absolutely solvent and sure of our position, we fear we could not meet our obligation at maturity if you were to make shipment in September." Thus there is disclosed a situation which explains in part the hesitancy of many jobbers to contract early for spring underwear and to repeat for fall only as emergency arise.

Comparatively few buyers came to the primary markets in August, and it was late in the month when most of the road salesmen went out. Of those who got started early, some returned after a week or two of discouragement. It seemed that buyers who were not absent on vacation ought to have been, so far as their usefulness to salesmen was concerned. Finally, it came to be the feeling that no business of moment need be looked for until after Labor Day, at the earliest. All interests were prone to wait for the September final word as to cotton.

Business in light weight underwear has not been satisfactory. In the first place, jobbers, aside from their gen-

(*Continued on page* 952.)

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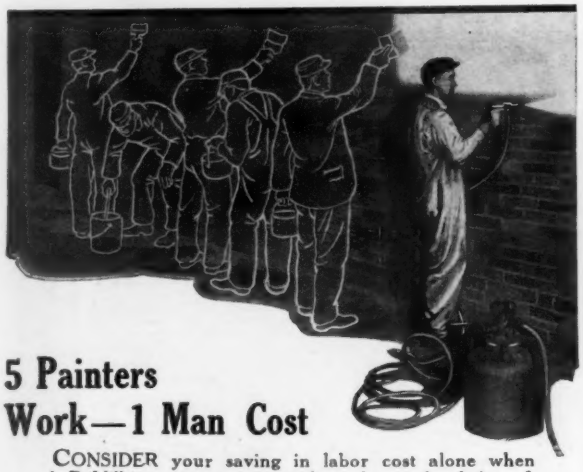

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—and we don't blame you. If we were in your position we would feel the same way—because AUTOGYP does so very much, and effects such unusual savings, it is really hard to become convinced that such a process really exists. However, AUTOGYP does just what we claim for it—dyes and bleaches in one operation of THREE hours time. Mill executives who put AUTOGYP to trial have found that we are actually conservative in our statements.

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AUTOGYP will prove a profit producer for you, and will render goods with a softer "feel."

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Surpass Chemical Co.
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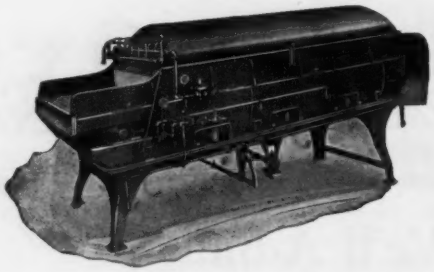

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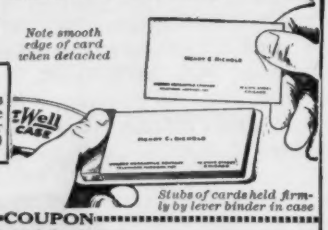

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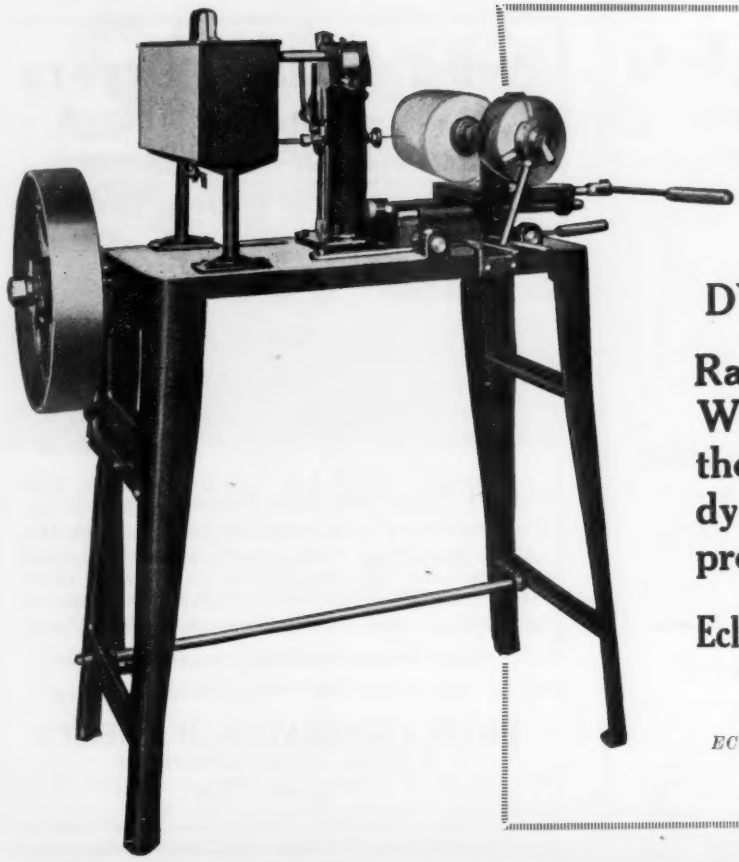

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STOP MOTION.

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With the MONAGHAN Sulphurous Acid Generator you can manufacture **Sulphurous** acid in your own dye-house, in quantities only as your immediate demands require, and at a much greater saving than sulphuric acid.

Further, **sulphurous** acid has a greater affinity for chlorine than has sulphuric acid. With the use of **sulphurous** acid, there is no danger of goods being damaged or tendered on dryer and you are assured of a uniform neutral product.

Besides assisting in the production of a better fabric, the MONAGHAN Sulphurous Acid Generator will effect a greater saving in power, labor and loss of time, allowing washers to produce more and eliminate two washings.

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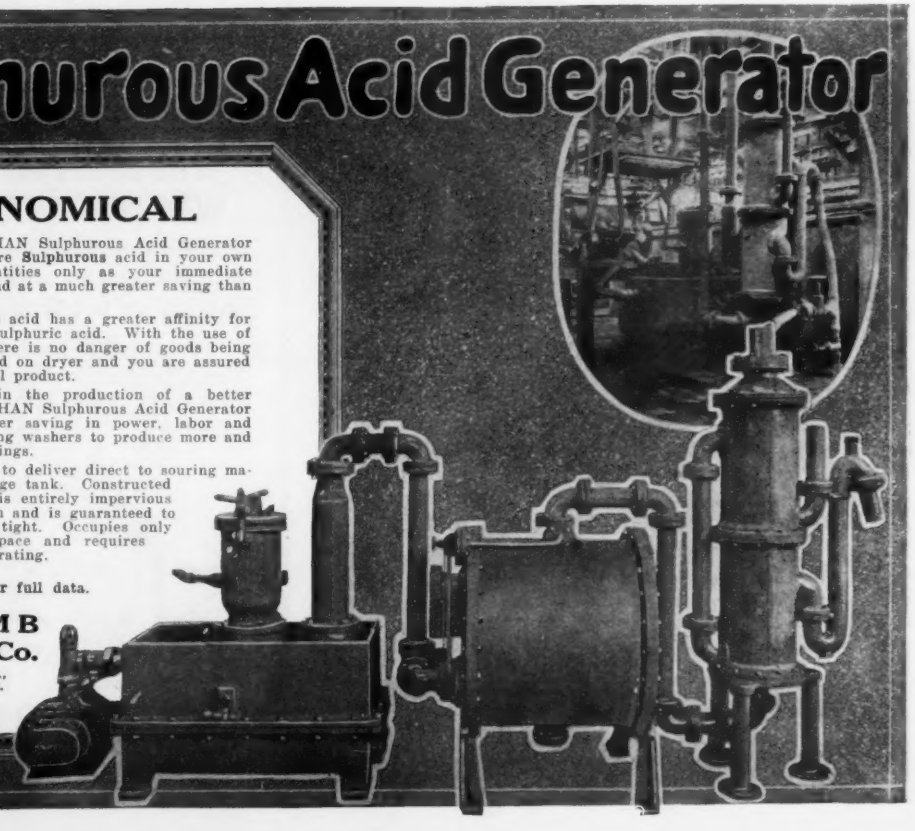
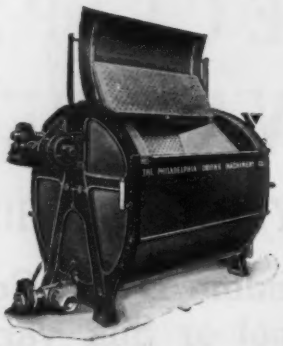
MACOMB Machine Co.

230 Newton St., Waltham, Mass.



HURRICANE



ALL MONEL DYEING MACHINE

This machine represents the latest development in the Hosiery Field. The tub and cylinder both being constructed of monel, permits easy cleaning of the machine and also allows the dyeing of various shades of colors.

The well-known "Hurricane" type of pocket and reversing mechanism is embodied in this machine as in our various other types. Built in 50 to 300 pound sizes.

Send for Bulletin RD-2 for further details.

Dyeing, Bleaching, Drying and Finishing Machinery for Hosiery.

The Philadelphia Drying Machinery Co.

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Perfect Insulated Dryers

MILLER SYSTEM

Twenty-Five Years of Successful Operation

Automatic Truck and Tray Type Dryers for all textile fabrics. Drawn Steel frame members uniform in size, not formed by a break. The only dryers carrying 85% Magnesia insulation, which is the highest grade insulation manufactured. All joints between the frame and panels that form the inclosure are air sealed. This improved patented construction is found only in the Miller Dryers.

The story will be told in detail if you are interested.

Correspondence Invited

DRYER CORPORATION OF AMERICA
GENERAL OFFICES AND PLANT
Warren, Ohio

Increases production yet cuts down labor costs

—in one mill, 4 HUMATICS took the place of 6 other extractors and reduced the number of operators by two. One man does all the work now. Write today—we'll send you full details of the HUMATIC's saving in labor, time and power.

The American Laundry Machinery Co.
Specialty Dept. C, Cincinnati, Ohio

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Automatic Safe!

Stop, Look and Listen!

When the old grade crossing is done away with and a bridge built in its place, away go the signs, "Stop, look and listen."

In just the same way when you use

WYANDOTTE DETERGENT

to clean your floors you can remove your danger signs for there are then no slippery floors to threaten the feet of the busy active worker.

This result has been realized so many times that a daily growing demand for this cleaner proves the truth of this claim for its safety value.

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in every package

And not only is this true but also the floor is made so faultlessly clean with so little effort and expense that mills are saving money on their floor cleaning costs.

Ask your supply man.

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WYANDOTTE, MICHIGAN

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Hundreds of America's largest textile mills place major reliance on Staley service for maintaining highest volume and quality of output, at lowest cost.

Staley technical and chemical experts diagnose individual production requirements, and compound special starches for each specific need. Absolute and unvarying adherence to original formulae is guaranteed by Staley manufacturing and laboratory facilities, the most advanced and comprehensive in the starch making industry.

An analysis of your mill conditions by our consulting staff carries no obligation. A line from you places our full resources at your service.

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evenly penetrates and gives a smooth, pliable finish

A thin boiling starch—absolutely uniform and equally as pure from foreign particles as the edible starch used in the home.

In addition to being manufactured by our special process, Douglas Crown Starch is finally bolted through silk in order to produce a finished starch absolutely uniform. The result is the most perfect working quality starch—a better starch cannot be made.

Years of experience in the manufacture of thin boiling starch and study of its use by the Textile Trade, have enabled us to produce the most satisfactory thin boiling starch offered.

We now offer Douglas Starch in the following grades—all made by our special process:

DOUGLAS CROWN STARCH
(as refined thin boiling starch)

DOUGLAS PEARL STARCH
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DOUGLAS WARP SIZING STARCH
DOUGLAS LION MILL STARCH

Our representatives will promptly supply samples and full information. Write to

PENICK & FORD, Ltd., Inc.

Manufacturers of Corn Products

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SODIUM HYDROSULPHITE—
Sulphoxylates and Allied Products.

LYKOPON—Sodium Hydrosulphite—
For reducing Indigo and vat dyes. Of highest quality and absolutely standard.

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Greensboro, North Carolina

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Incorporated

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Works: Bridesburg, Philadelphia, Pa.

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Concentrated Sodium Sulphide
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The MAKENWORTH COMPANY
Greensboro, North Carolina

FOR that silky, soft "kid glovey" finish on fine shirtings, sheer nainsooks, dainty organdies, and voiles, on high grade ginghams and sateens, use

CREAM SOFTENER J. B.

White goods stay white and even the most delicate shades are not affected by this creamy, white softener.

A finish cannot always be judged satisfactory immediately after it is applied. Father Time, the most critical judge often makes an advrse decision after the goods have been on the shelf a few months.

Our Cream Softener J. B. is especially adjusted and standardized to cope with atmospheric, storage and other conditions to which material is subjected after finishing.

We guarantee this softener will not cause any regrets. The first and last decision will be favorable.

Allow us to send samples.
The product will prove itself.

JACQUES WOLF & CO.
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Uniform in Application

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Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

will remove Oil Stains.

If you are troubled, write us.

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"ARTCO" SILK OIL

for

***use on* Artificial Silk**

Hosiery and Sweater Knitters find "ARTCO" Silk Oil to be the best product for this purpose.

Prevents waste and saves time

Softens the Thread and lays the Fibre, and produces a Fine Lustre.

Samples and full information on request.

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"BRETON" MINEROL "F"

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"It improves the white"

BORNE, SCRYMSER CO.
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Solid and Flaked

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Chlorantine Colors

The conspicuous feature of the Chlorantine Colors is their *unusual fastness to light.* For level dyeing, where fastness to acid, alkali, rubbing and hot pressing are required—THEY ARE UNEXCELLED.

Recomended for application to all goods which must withstand the action of light, such as UPHOLSTERY GOODS, CASEMENT CLOTHS, CURTAINS, VELVETEENS, LINEN PLUSH, Etc.

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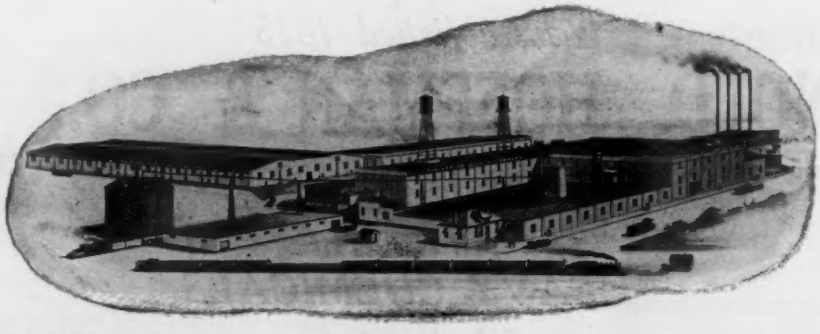

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The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

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If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

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Thirty-five trained dyestuff salesmen are maintained by the Grasselli Chemical Co., to serve you and to assist in the solution of your dyestuff problems.

When next they call, ask them for the facts about

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Dyestuff Department

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Used Where Only The Best Cleaning Material is Wanted Try It And Check Results

"ASK YOUR SUPPLY HOUSE"

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THE

"Southwestern" Iron Clad

Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT! PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through all principal distributors.

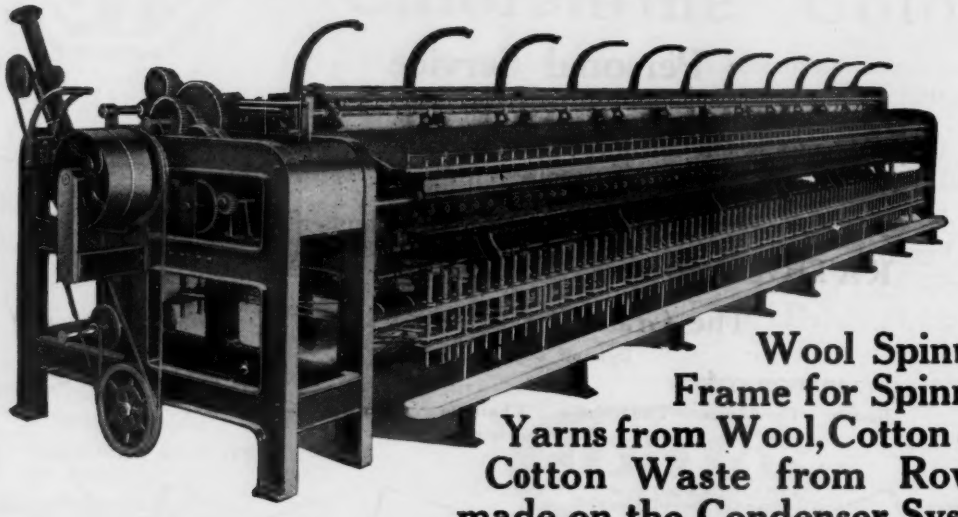
The Southwestern Broom Mfg. Co.

Evansville, Indiana

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



Wool Spinning Frame for Spinning Yarns from Wool, Cotton and Cotton Waste from Roving made on the Condenser System

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ESTABLISHED OVER FIFTY YEARS

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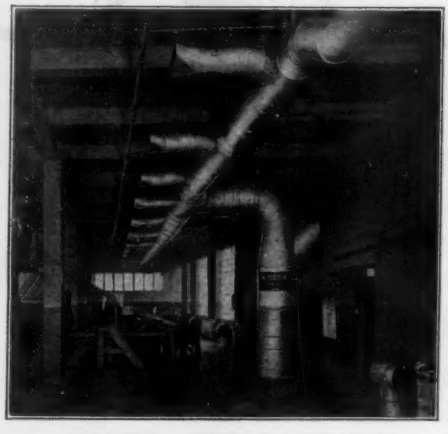

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Placing your problems in the hands of this organization, gives you the benefit of all the experience of the foremost engineers in the country on air conditioning systems.

These specialists who are nationally known and recognized, have made air conditioning their life study.

They will be glad to refer you to an installation near you or give you the names of concerns in your own business who have successfully installed our air conditioning systems. You may then get in touch and understand why Sturtevant-Fleisher Systems are preferred.

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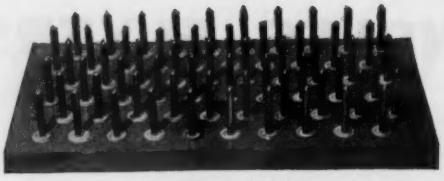
KORE-LOKT PIN BOARDS
REG. U. S. PAT. OFFICE



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Are You Responsible

for good weaving in your mill? If so, you should know Kore-Lokt Pin Boards and the story of their usefulness in modern loom equipment.

Expert Opinion from men in charge of the weave rooms in prominent mills is available to superintendents and overseers upon request.

Send for this information so you may know the merits of Washburn Kore-Lokt Pin Boards as an improvement over old style Filling Boxes. Learn how the other fellow checks up results from the "Build of Bobbins."

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PERFECTION SHELL ROLLS

FOR
BLEACHERIES
BALL WARPING
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CORD FABRIC SHIPMENTS

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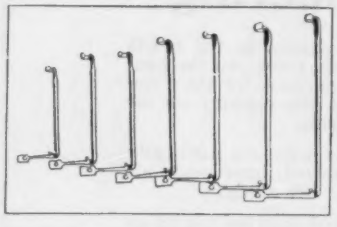

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Let us help you as we have helped others---to increase production and cut down expenses.

"Write for a catalog."

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AMERICAN SUPPLY COMPANY
PROVIDENCE, R. I.

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LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
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We make a specialty of Harness for Warp Drawing Machines

CROMPTON & KNOWLES DOBBIES

NEW FEATURES OF SPECIAL INTEREST TO WEAVERS AND FIXERS

1. Built with slotted fingers and locking rod (patented), making it easy to remove, clean and replace the fingers.
2. We are now prepared to equip the dobby shown above with pressed steel jack backs and drop forged top and bottom hooks.
3. We call attention to the carefully machined swivels and studs used for operating the dobby knives.
4. This dobby can be applied readily to any make or type of loom.

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Let reputation be your guide. Take guesswork out of shuttle buying. Specify Williams shuttles and assure yourself of a "ONE QUALITY PRODUCT." Consider also the service we render and that we guarantee our product. A test will answer any question that you may have.

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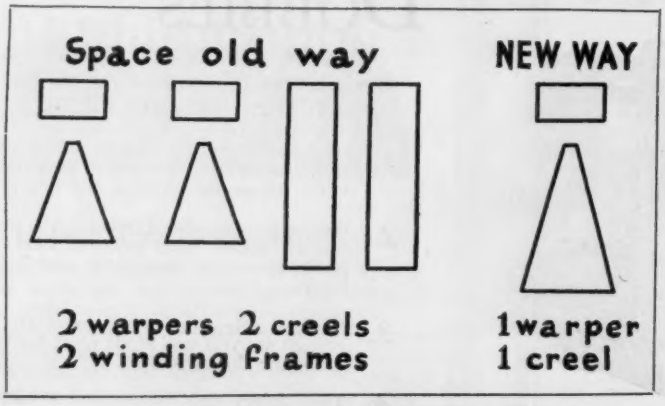
NEW AUTOMATIC CREEL

for direct warping from FILLING WOUND BOBBINS



COMPLETELY ELIMINATES the

Spooling of the yarn

Spooling waste

Undue and irregular tension of yarn due to spooling

Stoppage for doffing

Doffing is done while warper is running.
Greater production from better warps at lower cost.
Better loomage from auto-creel warps because
Elasticity is preserved in yarn.

For Information address

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TRADE MARK

LOWELL MILL CRAYONS

the original crayons for textile mill use, and for years the standard with America's leading mills.

Lowell Crayons are made in white and 15 colors, as follows:

1 Yellow	2 Red	3 Pink	4 Blue	5 Purple	6 Brown
7 Black	8 Green	9 Orange	10 Dark Green	11 Light Red	
12 Rose Pink	13 Light Green	14 Light Blue	15 Orange No. 2	Wh.	

Order by number, please.

LOWELL CRAYON CO.

Lowell, Mass.

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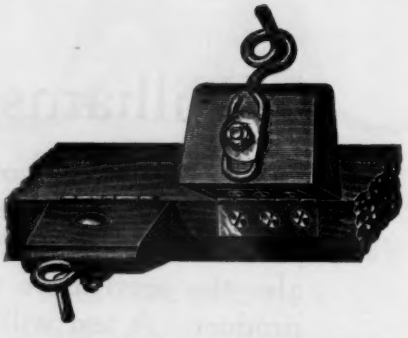

For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

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THE I. E. PALMER COMPANY

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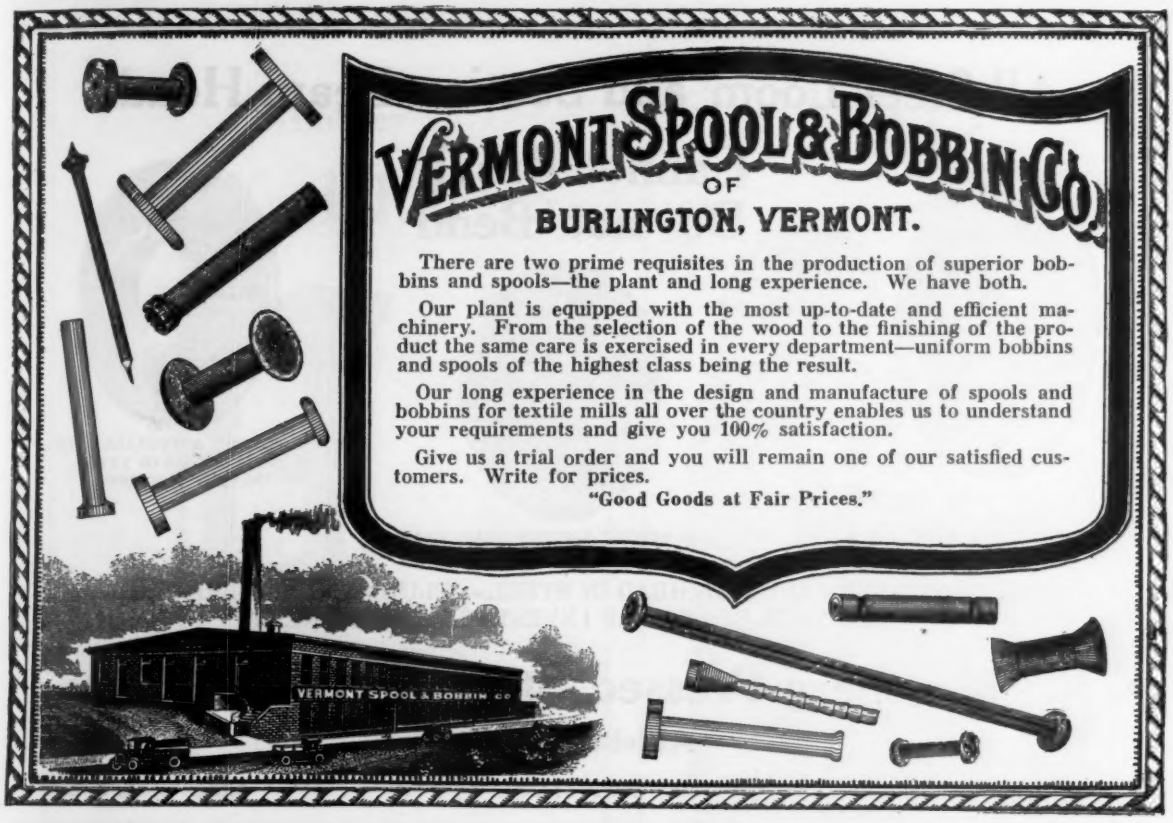
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BURLINGTON, VERMONT.
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.
Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.
Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.
Give us a trial order and you will remain one of our satisfied customers. Write for prices.
"Good Goods at Fair Prices."
VERMONT SPOOL & BOBBIN CO

What Part of the Spool is First to Wear Out?

Your superintendent will confirm our statement that 99% of all Warper, Twister or Spooler Spools become useless on account of the heads breaking, wearing rough or loosening. This is true of all types of Spools heretofore on the market.

With the Lestershire Type Vulcanized Fibre Head Spools just the opposite is true. The Heads will outwear the barrels because Hard Vulcanized Fibre (the same material from which end thrust bearings and automobile gears are made) will never break, wear rough nor splinter.

Of course the first cost is higher but, figuring your charges per thousand spools per year, they are by far the most economical spools on the market today.

In addition Lestershire Fibre Head Spools will in the ordinary mill give you an increased unloading production of nearly 50%. Put a row on your creel and compare the time necessary to unload with any other type Spool.

On the smooth Rock Maple barrel, cleanly jointed to the Fibre Heads which cannot get rough and cannot be dented, there is no place for the yarn to catch.

Spindle wear is also eliminated by bushings of hard well seasoned Dogwood.

Increased traverse can be had which will give you greater yardage on your spools. This means a saving of many dollars in the course of a year, not only direct but in labor required to change the spools.

At your request we will gladly send samples for purposes of test and comparison.

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Manufacturers Mill Spools, and Bobbins, of Every Description

General Offices and Factory
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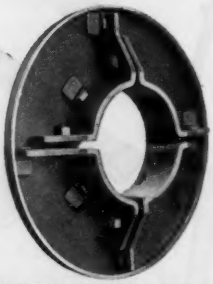
All Steel Loom and Section Beam Heads

Cannot Break
Do not Bend

"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
Patent Pending

"ALL STEEL" SECTION BEAM HEAD
PATENTED



"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

DUPLICATE YOUR CAST IRON HEAD IN STEEL — ELIMINATE ALL BREAKAGE
MAKE YOUR BEAM HEAD INVESTMENT PERMANENT

Mossberg Pressed Steel Corporation

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SOUTHERN SPINNERS
are using
"AMTEX"
SPINNING, TWISTING AND SPOOLER TAPES
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

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For Cotton, Woolen, Worsted, Silk, Tire Fabrics, Webbing, and Wire Cloth.

We make a specialty of all Metal reeds, for Tire Fabrics, and Leno work.

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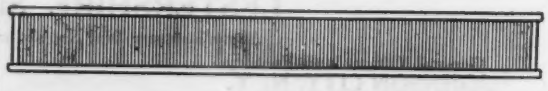

Another

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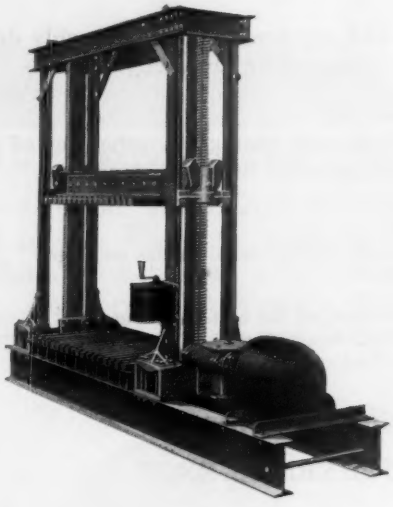

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Speed, Strength, Simplicity

Built any size and pressure.

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Watch for the Yarn Press.

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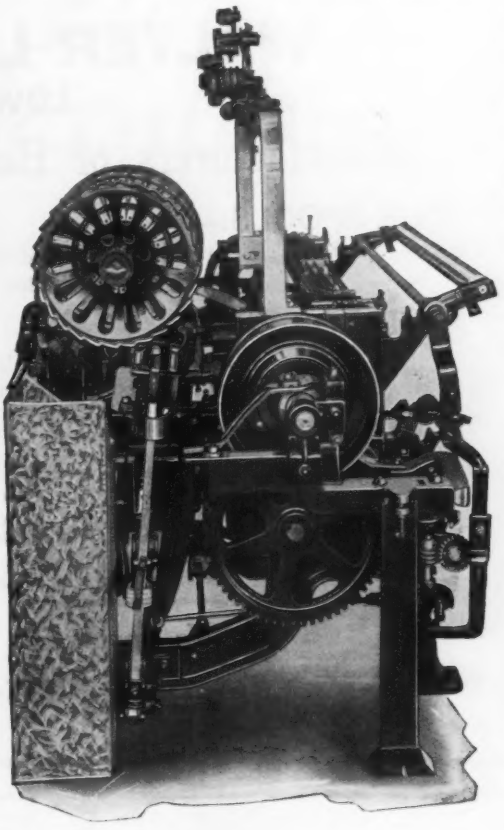

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NORDRAY

Automatic Loom

Multiple-harness, Feeler type

built by

HOPEDALE MANUFACTURING CO.

at MILFORD, MASS.

SOUTHERN OFFICE at GREENVILLE, S. C.

This loom was shown at the Late Greenville Exposition and excited great interest.

It is Still the Simplest.

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Manufacturers of Bobbins, Spools and Skewers

OUR SPOOLS:—

Are made to stand severe service and are made from thoroughly dried stock, so constructed that they are giving entire satisfaction.

OUR BOBBINS:—

Are made from the best grade of stock, and through the efficiency of our workmanship, are true running, and properly fitted on spindles.

OUR PRODUCTS:—

Bobbins—Warp and Filling. We put on all kinds of metal shields and caps.
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Our Metal Bound Spools are pronounced the best on the market.
Skewers—Cop, Warper and Roving, of all descriptions.
Twisters—Universal Winder Rolls and Bobbins, Comber Rolls, etc.

We Specialize in New Mill Equipment

CHARLOTTE SUPPLY CO., SOUTHERN AGENTS.

The Perfect School Desk

That Will Save You Money

We also Manufacture Teachers' Desks.

Many letters from leading educators is ample proof that our desire to produce a more perfect desk at a more reasonable price has been accomplished.

Large numbers have been sold to schools all over the South, and their merit and economy is best attested to by our many duplicate orders.

The hardwood frame, noiseless hinges, perfect curve of back and seat, standard color and finish, sanitary, indestructible construction—all go to make a desk that is the most practical and the most economical desk on the market. They are shipped set-up.

Ask for booklet, or estimates on any number of desks for your school building.

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Both Spell Economy

This is No. 20 Re-Fil-It Floor Brush

Fillers for all conditions can be used in this Re-Fil-It brush-hair combinations, broom corn, bass, etc. For Spinning Rooms this brush with short corn filler is ideal.

This is No. 3 Re-Fil-It Broom

Equal in bulk, but superior in service and economy to a No. 8 stitched broom. It is designed for general sweeping.

Write for prices and particulars.

RE-FIL-IT BROOM MFG. CO.

185 Devonshire St., Boston

Electric Scrubbing!

Saves Time and Labor in Textile Mills

Floors are made *clean* and kept *clean* with least trouble and lowest cost by the FINNELL System.

Three hundred textile mills have already adopted the Finnell system. They are keeping their mills cleaner and in this way are helping to keep their workers healthy, happy and efficient. Compared to the FINNELL System hand and knee scrubbing is not only inadequate—it is extravagant. There is a profitable size outfit for any size mill. Write for large illustrated broadside containing complete information on the dividend-paying FINNELL SYSTEM.

Now Ready! Motion pictures of FINNELL machines in operation in textile mills. One of our experts will be glad to bring his projector to your office and give a private showing. No obligation. Write.

AMERICAN SCRUBBING EQUIPMENT SALES CO.

Also distributors of Finola Scouring Powder
General Offices and Factories

59 North Collier St., HANNIBAL, MO.

FINNELL SYSTEM

OF ELECTRIC SCRUBBING

DISTRICT OFFICES IN PRINCIPAL CITIES

"Clean Floors Reflect Clean Business"

MILLS METAL

TOILET PARTITIONS
SHOWER STALLS
DRESSING ROOMS
SHELVING
TABLES
DOORS
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Attractive :-: Sanitary :-: Permanent

"Slant Lip Diamond Rail Top and Bottom"

Constructed entirely of the highest quality rust-resisting steel.
Finished in Olive Green or Gray Baked Enamel.

Watch future ads for other products.

THE MILLS COMPANY, *Dept.* A, Cleveland, Ohio.

AIR Engineering Service

The American Blower Company offers the cooperation of a competent Engineering department in the solution of any problem along the following lines:

HEATING AND VENTILATING
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American Blower service and mechanical equipment represents the development of forty successful years. Write for descriptive Bulletins.

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(330)

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SIROCCO
ENGINEERS • VENTILATING FANS AIR WASHERS • BLOWERS ENGINES
FOR HEATING, VENTILATING, DRYING, AIR CONDITIONING, MECHANICAL DRAFT

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Leading cotton and silk mills order Lewis Box Trucks and Shipping Boxes

For their remarkable durability in hard service—for their aid in cutting production costs and making it easier to handle delicate fabrics—Lewis Box Trucks and Shipping Boxes are in demand by leading textile mills everywhere, including these typical users:

Holeproof Hosiery Co., Milwaukee, Wis.
Durham Hosiery Mills, Inc., Durham, N. C.
Vesta Underwear Co., Providence, R. I.
Crane Bros., Kingston, Pa.
Francis Willey & Son, Boston, Mass.

This recognized superiority of the Lewis line comes of 30 years experience in weaving wood and wire into the most durable containers and those that give lowest final cost. Write us regarding Lewis containers and the newest ideas for handling textiles in process and in shipment.

G. B. LEWIS COMPANY
WATERTOWN DEPT. C-6 WISCONSIN

Save one-third the freight cost by having them shipped knocked down.

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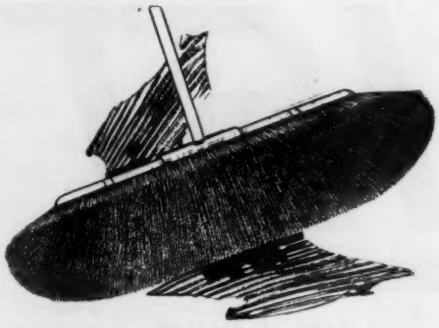


Proved Better

Special Textile Floor Sweep---Series No. 142

Our No. 142 under actual working test has proven to many Cotton Mills its economy over brooms both in labor and lasting qualities. One 142 will outlast under test—four brooms. Because of its shape and size, one man can do as much work with a 142 as three men and three brooms can do.

It is built with just the right combination of fibre and tampico to sweep up all lint and it will keep floors cleaner at less expense than any other method you can use.

Specifications

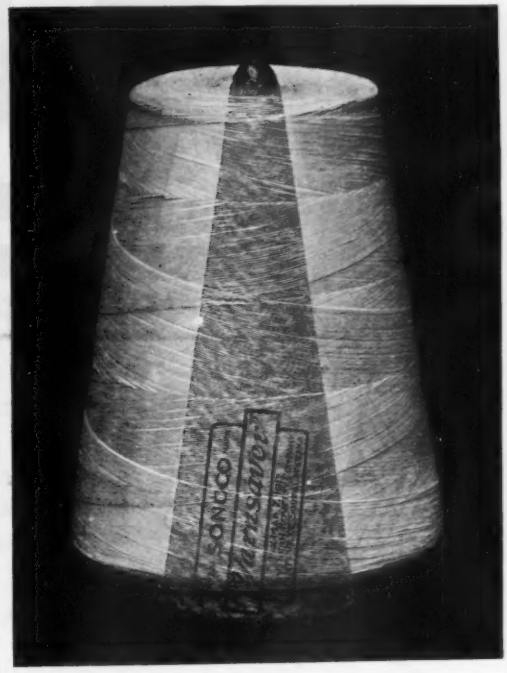
No. 142 Sweep—This sweep is made on a polished wood block flared well at ends. It has a center of strong and durable fibre and tampico around the outside. Made light and easily handled. Made in lengths of 14, 16, 18, 24, 30, 36 and 48 inches. Order by length.

ATLANTA BRUSH CO.

ATLANTA, GA.

ATLANTA BRUSH COMPANY

A Brush for every Textile Need



Because Yarn Costs Money

It must be wound without waste: It must deliver without waste: and, as you know, that absolutely means that every cone must be perfectly round and perfectly tapered, balanced and surfaced.

Because positive machine methods assure these qualities for every Sonoco Cone, it is money in your pocket to always

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"SONOCO"

Cones and Tubes

Send for samples and prices to

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Sonoco Products Co., Successor

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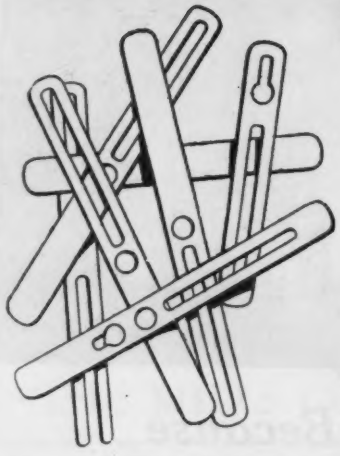
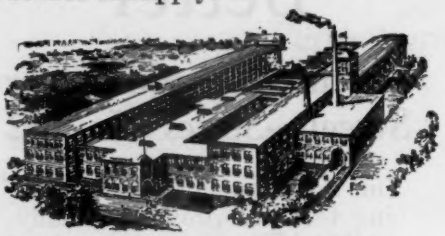


Satin Finish Loom Drop Wires
are *Good Wires*

Uniformly made—free from burrs.
A reliable source of supply.

The Greist Manufacturing Company,
Dept. "C"
New Haven, Conn.



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Interesting, illustrated folder **"How to get Greater Desk Efficiency"** shows how to keep your desk cleared for action. Thousands of Kleradesks are giving entire satisfaction. Saves time locating, distributing or sorting papers. Takes less space than a tray. Sent FREE trial.

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Send for FREE catalog showing details covering names of your best prospective customers. Counts and prices are given on thousands of different Mailing Lists.

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Cost

may be a primary consideration

The Liberty Knotter

not only fills the requirements of low first cost but is most simple in construction and economical in upkeep and operation. Give it a trial.

Guaranteed for one year
Write for information

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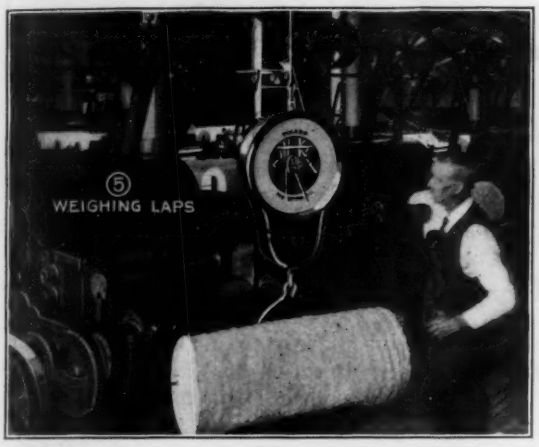

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And for many other purposes.

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106 Sales Rooms and Service Stations in the United States and Canada. Others in thirty-four foreign countries

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SANITARY DRINKING FOUNTAINS
are
ECONOMICAL
DURABLE
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Low first cost and up-keep.

Write today for proof.

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ICE COOLED

MFG. EQUIPMENT & ENG. CO.
Originators and Largest Makers of Ice Cooled Drinking Fountains
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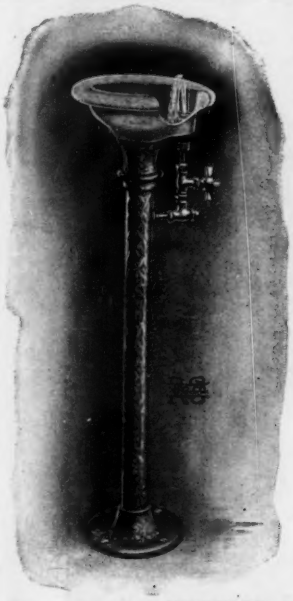

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—Lots of it Keeps Your Workers Going Full Speed

Winter or summer, pure cold drinks are a sure stimulus to the best efforts of your workmen. They prevent fatigue that comes with thirst—keep every man fresh for greater effort. But if they must go to a distant hydrant for those drinks, time wasted brings a loss instead of a gain in production. Let them turn to convenient bubblers—equip your plant with

R. & S. VERTICO SLANT FOUNTAINS

In addition to saving hundreds of wasted steps, R & S Vertico Slant Fountains are thoroughly sanitary and use one-half the water the old style head uses. The angle-stream prevents germs falling back into jet. LIPS CANNOT TOUCH THE NOZZLE,—danger of contamination is avoided. Among our numerous designs there is one perfectly adapted to service in your mill. Send at once for our 73-page catalog—it shows the R & S fountains. Write today.

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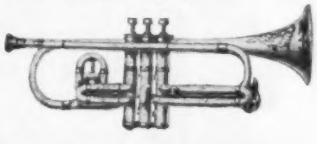
John Philip Sousa endorses Conn instruments.

Let Conn Help You Organize a Band

Our half-century of experience is at your disposal. We'll gladly advise with you regarding the benefits of a band or orchestra and explain how the details of organization can be carried out without obligation to you.

Complete Sets of



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Conn equipment insures rapid progress because Conn instruments are easiest to blow and possess many exclusive features which make them most desirable for artists and beginners as well.

For Complete Information Write
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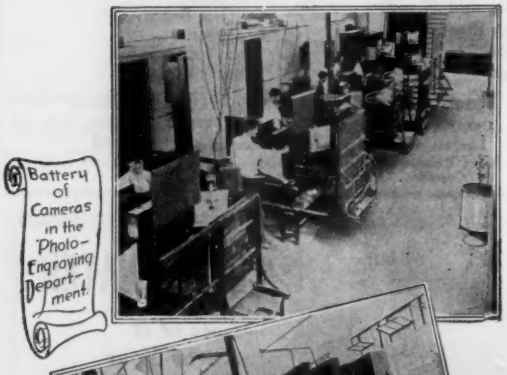
If it is an especially large illustration for an especially large piece of literature, chart, birds eye view, map, etc. Whether it be in one or more colors, our plant is equipped to supply your needs. No halftone or line plate too large or too small for our equipment.

Illustrating Your Literature

Sometimes in the preparation of your sales and advertising plans you find the need of some especially prepared piece of literature, the execution of which will baffle your photographer, electrotyper and printer. Frequently you may seek a service that the ordinary plant cannot give.

Our plant is designed and equipped for the accomplishment of many difficult products that cannot be secured from most photo-engraving establishments; is equipped to furnish the best of photo-engraving, electrotyping, printing, nickeltyping, commercial art and allied service, whether large or small, whether one or more colors. The extent of our equipment is reflected in the large process camera, which can furnish you with process color plates as large as a yard square. One of the 6 largest in the world. If you have an idea you wish carried into execution, we are at your service. We will gladly perfect it and illustrate it.



Battery of Cameras in the Photo-Engraving Department.

A Close Up View of One of the 6 Largest Color Process Photo-engraving Cameras in the World—Installed in the Photo-engraving Dept. of Jacobs & Co.

Jacobs & Company
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Advertising, Commercial Art
Photo-Engraving—Electrotyping
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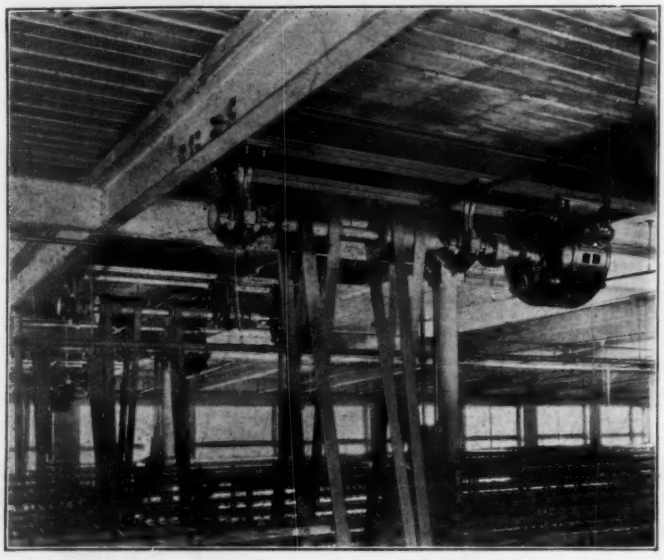
"FOUR FRAME DRIVES"



Universal Spinning Frame Drive

For the Electrification of Old Mills

Avoids Shifting of Frames

The equipment consists of a special spinning frame motor for ceiling suspension equipped with conduit terminal box; bushing type flexible coupling; adjustable hangers; shaft with paper pulleys for driving four spinning frames.

SEND FOR BULLETIN.

ALLIS-CHALMERS MANUFACTURING CO.
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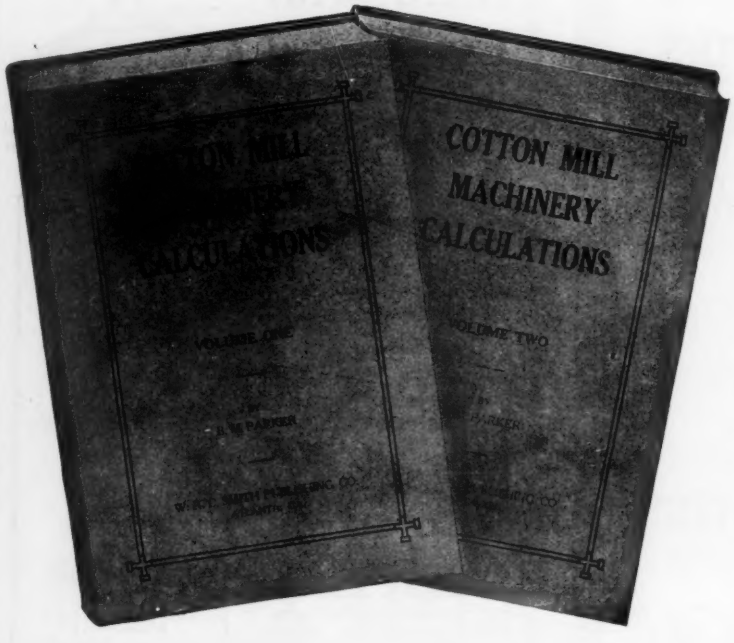

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on this subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them in conjunction with a subscription to COTTON.

Write for circulars and full information.

Experience!
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OVER THE SOUTH
there are over two-and-a-half-million happy spindles that are driven or lighted by H. & G. Trouble-Proof Electrical Installations. Every one of these installations presented problems that required careful planning and ability to forecast the contingencies of service.
The experience gained in solving the many electrical problems of Southern mills is assurance to you that no matter what your problem is, whether it be the installation of a motor or a few lights or the installation of an entire electrical installation for mill and mill village, the problem can be solved more economically for you, not only initially but permanently, by H. & G. Service.
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GENERAL ELECTRIC CO.'S PRODUCTS—MOTORS, WIRE, WIRING DEVICES, ELECTRICAL, PORCELAIN CONDUIT AND FITTINGS, TRUMBULL SWITCHES.

Complete Stocks in Columbia for Prompt Shipment.

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We are rendering textile mills all over the Southeast prompt and efficient service, supplying not only the most efficient and effective systems of illumination particularly suited to every textile mill use, but any type of Edison Mazda Lamp desired.

Whatever your electrical requirement, be it illuminating units, lamps, motors, wiring or what not, you will find Carter Electric Service more satisfactory and prompt.

CARTER ELECTRIC CO.

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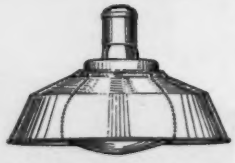

The Glassteel Diffuser Equipped With a Cast-Aluminum Holder

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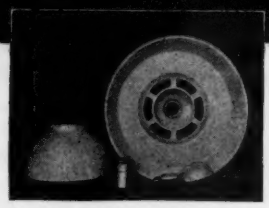


Unassembled view of IVANHOE Glassteel Diffuser

A Scientifically-Designed Textile Lighting Unit

Diffused light instead of *reflected* light. That was the big idea in the minds of the engineers who designed the IVANHOE Glassteel Diffuser.

Shadows are noticeably softer. Glare effect is materially reduced. And there is just enough light on the ceiling to take away the objectionable blackness overhead. Exactly the kind of light needed for some textile operations.

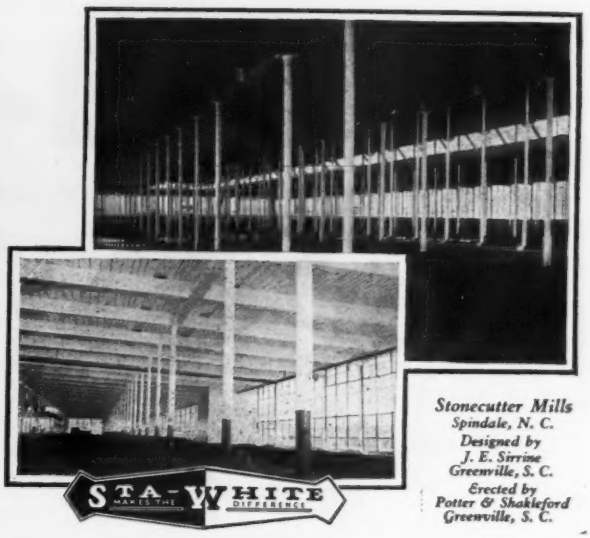
In the IVANHOE Glassteel Diffuser the lamp is entirely enclosed in a diffusing globe. There is practically no chance for dirt to get inside. Dust and lint can easily be washed or wiped from the outside, and the unit thus kept up to full original efficiency.

Near you is an IVANHOE distributor trained to meet lighting requirements of mills like yours. Get his advice as to the proper placing of Glassteel Diffusers. Or write us and we will send you his name and a booklet describing the Glassteel Diffuser.

IVANHOE-REGENT WORKS
of General Electric Company
Cleveland, Ohio

IVANHOE

GLASS SHADES—STEEL REFLECTORS



Stonecutter Mills
Spindale, N. C.
Designed by
J. E. Sirrine
Greenville, S. C.
Erected by
Potter & Shakleford
Greenville, S. C.

Why Sta-White Leads

The plain proof of value, demonstrated in every department of the textile mill—with actual service facts back of every claim made for it, has established STA-WHITE as a leader among mill white paints.

It is a recognized fact that demonstrated value and high quality backed by many years of satisfactory service are the vital factors in determining value. When you pay a fair price for a paint whose quality is unquestioned, you are then assured of service.

STA-WHITE is the mill white paint that stays white. Its unsurpassed finish and light reflecting qualities—its proven durability—are the safety factors which should guide you in your selection of mill white paint.

STA-WHITE is one of the DEGRACO line of dependable paints. Its use is utmost assurance of definite paint satisfaction.

DETROIT GRAPHITE COMPANY
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DEGRACO PAINTS are sold through branch offices with warehouse stocks in all principal cities.

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All Colors for All Purposes

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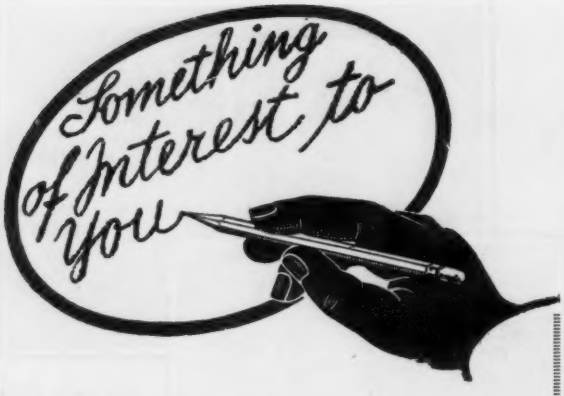

If you want to save on Paint---

Economy in the purchase of paint lies not only in the original cost per gallon paid for the pain, but in durability. By **durability**, we mean a paint that will stay **white** indefinitely, that will **stay** on the walls and ceilings when applied, a paint that **will not** peel, crack, chip, or blister, no matter how hot or cold may be the atmosphere, a paint that is impervious to acid fumes, water, gases, etc. That's exactly what we mean when we say ZEMCO-LITE is the DURABLE paint. ZEMCO-LITE properly fills every possible requirement that could be expected of a mill-white. Not only is ZEMCO-LITE the best mill-white, but it is the most economical.

Because of its base of pure white Portland Cement, ZEMCO-LITE is the last word in durability and economy. Mixed with water—just like cement.

ZEMCO-LITE is also prepared in colors for exterior painting of mill villages, for painting, wood, iron, stucco, stone, brick, etc.

Climatic conditions do not have the slightest effect on ZEMCO-LITE. Rain, sun, heat, cold, let them come, ZEMCO-LITE can hold its own.

Write for full data and color card.

American Cement Paint Co.
Chattanooga, Tenn.

Zemco-lite
TRADE MARK
"The Cement Paint"

C. P. MURPHY'S SONS

ESTABLISHED 42 YEARS **ATLANTA, GA.**

We Are Acquainted

with mill roofing conditions, because we have been solving roofing problems for 42 years. No matter what your requirements, whether large or small—"Done By Murphy" means lasting satisfaction and economy.

Let us quote you prices on

GRAVEL AND SLAG ROOFING
WATERPROOFING, INSULATED ROOFS
TAR CONCRETE FLOORS

Here's a few mills whose roofs are the product of "Dixie Reliable Roofers"

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SCOTTDALE MILLS, SCOTTDALE, GA.
HILLSIDE COTTON MILLS, LAGRANGE, GA.
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ROYAL MILLS, CHARLESTON, S. C.

"Dixie's Reliable Roofers"

Uneven Laps

Cause uneven work. Slipping evener cone belts cause uneven laps. Friction in the apron and evener rolls makes the cone belt slip.

Ball bearings remove this friction and allow the cone belt to give the proper feed of cotton to the beater.

The installation is not expensive and is used on hundreds of lappers.

AldricH MachinE
Ball WorkS Bearings
Greenwood, S. C.

T-U-P-E-L-O

is a species of lumber that might well be said to be "grown to order" for

TEXTILE MILL FLOORS, PLATFORMS,

and other places and uses where "wear and tear" must be expected and provided for. *Leave it to TUPELO!*

This Softwood Hardwood has an "involved" grain which keeps it from slivering or splintering. A TUPELO floor wears smooth because it wears little—always looks well, because TUPELO has a fine, white color and a satiny sheen.

We'll gladly tell you the whole, interesting story of TUPELO if you'll write and say "we're listening." When? TODAY?

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(*Please address the office nearest you*)

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Plates
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Rods
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Fence
Hoops
Electro-Galvanized Conduit
Enamelled Conduit
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Pipe Fittings
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YOUNGSTOWN

Quality and dependability in Pipe are the result of careful manufacture and the use of nothing but the best of raw materials.

YOUNGSTOWN PIPE is made by the second largest manufacturer of pipe in the world, and all raw materials as well as every process is under one control.

No better pipe is or can be made. The user of "Youngstown" is absolutely assured of this fact.

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Youngstown, Ohio

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As Used on the
WERNER DYE JIGGERS

Equip Your Dye Jiggers the "JOHNSON WAY"

Double Clutch Exterior

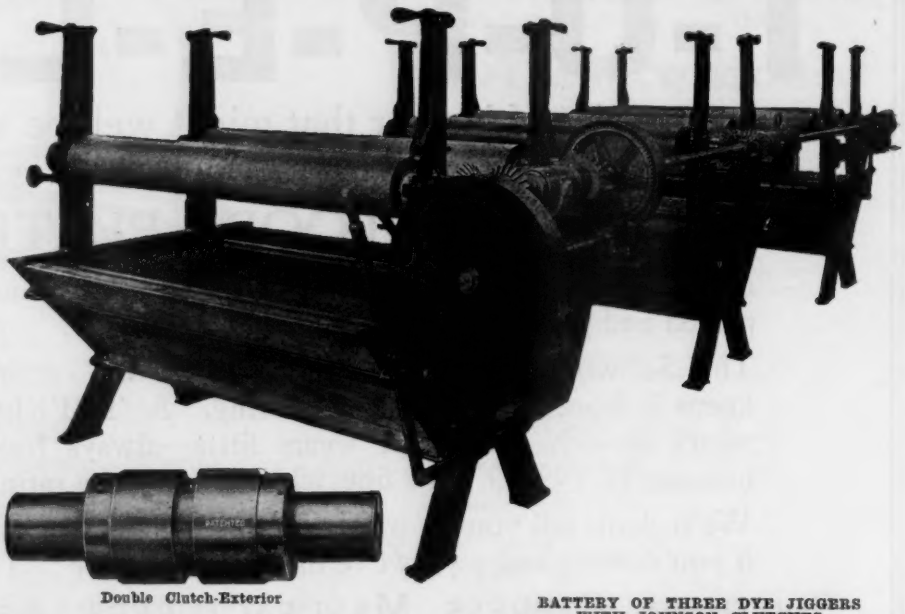
A No. 4 Double Clutch is used on the end of each machine to operate the rolls either way through bevel gears mounted on hubs.

For textile machinery it is very essential that a reliable and powerful clutch be used so that the machine will always be working at its maximum capacity and thereby be efficient in output.

The Johnson Clutch has been tried by the leading textile machine manufacturers and adopted on its merit for many machines. The most of these machines are of special design for a particular purpose and therefore cannot be given publicity.

Let us work out your problems.

Write for Catalog "G."



Double Clutch-Exterior

BATTERY OF THREE DYE JIGGERS WITH JOHNSON CLUTCHES
Courtesy of Werner & Co., Inc., Passaic, N. J.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

DETROIT
STAGGERED GRIP
BELT LACING

DETROIT is the ONLY Wire Belt Lacing that takes a STAGGERED GRIP on the Belt—

It also has many other advantages

Detroit Belt Lacer Co., Detroit, Mich.

BETTER **NON-FLUID OIL** LUBRICATION

1 Trip With the Oil Can Instead of 3 to 5 If You Use

TRADE MARK NON-FLUID OIL REGISTERED IN UNITED STATES PATENT OFFICE

Modern Textile Lubricants that stay in the bearings and actually last 3 to 5 times as long as liquid oil.
By using NON-FLUID OIL you save time—save lubricant—save wear—and get **better lubrication at less cost per month.**
And NO MORE OIL STAINS—NON-FLUID OIL won't drip or spatter on to goods.
Write today for free sample and "Bulletin on the Lubrication of Textile Machinery."

New York & New Jersey Lubricant Co.

401 Broadway New York
Southern Agent, L. W. Thomason, Charlotte, N. C.
Ample Stocks at Our Branches
Charlotte, N. C. Greenville, S. C.
Atlanta, Ga. New Orleans, La.

AT LESS COST PER MONTH

Chapman

"You Pay for them Whether You Buy them or Not"

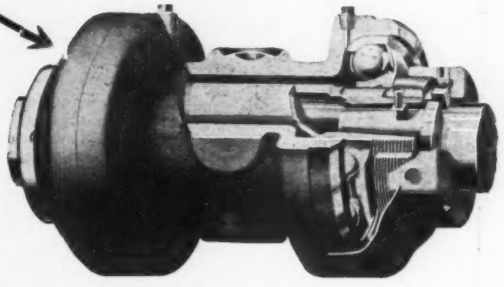
The place to save power is in the lineshaft bearings—they are the biggest wasters

Here's the Remedy

Install Chapman Ball Bearings—they fit every standard hanger without a change—and save from 15% to 35% of the lineshaft power that formerly went to waste.

Use this excess saved power for driving more machinery or speeding up the present installation. ***It's clear profit in your pocket.***

Say the word and we will send you actual facts and figures of what has been saved in other mills.



THE TRANSMISSION BALL BEARING CO., INC.

ELIMINATORS OF BEARING TROUBLES

1050 MILITARY RD. BUFFALO, N. Y.

100 INCHES OF BELT

can be laced with one box of

BRISTOL'S

Patent Steel Belt Lacing

A HAMMER is the only tool necessary—you already have that.

Saves time—saves money—always ready.

Have you seen Bulletin J-713?

THE BRISTOL COMPANY

WATERBURY, CONN.

Boston New York Philadelphia Pittsburgh
Detroit Chicago St. Louis San Francisco

If You Were A Coal Dealer

If you were a coal dealer, you wouldn't think of permitting your coal to be unloaded by hand, because you're the type of business man that believes in modern equipment for saving time, power, labor and money.

You would have an up-to-date establishment like all progressive dealers have today. It would probably consist of elevated bins where wagons and trucks could be loaded automatically. The bins would receive their supply of coal from hopper-bottom cars by means of a *Godfrey Conveyor*.

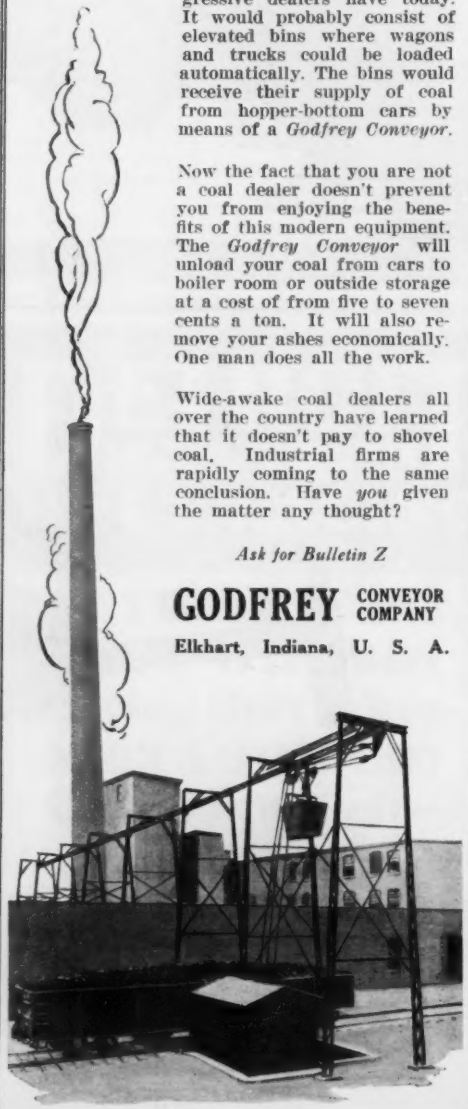
Now the fact that you are not a coal dealer doesn't prevent you from enjoying the benefits of this modern equipment. The *Godfrey Conveyor* will unload your coal from cars to boiler room or outside storage at a cost of from five to seven cents a ton. It will also remove your ashes economically. One man does all the work.

Wide-awake coal dealers all over the country have learned that it doesn't pay to shovel coal. Industrial firms are rapidly coming to the same conclusion. Have *you* given the matter any thought?

Ask for Bulletin Z

GODFREY CONVEYOR COMPANY

Elkhart, Indiana, U. S. A.



The Answer to the Call for

BETTER OXYGEN

"STANDARD"

99.5% pure

"Standard" Oxygen Means

Efficiency

Economy

Best Results

QUICK DELIVERIES

STANDARD GAS PRODUCTS CO., INC.

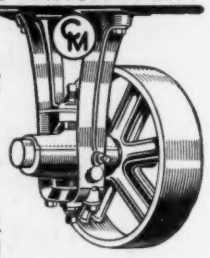
ATLANTA, GA.

STANDARD

OXYGEN FOR WELDING

CRESSON-MORRIS

POWER TRANSMITTING MACHINERY



Power transmitting machinery

Shafting

Rope transmission

Machine moulded and cut iron and steel gears for heavy service.

Complete plant equipment.

Engineers; founders; machinists.

Sugar centrifugals.

CRESSON-MORRIS CO.

18th Street and Allegheny Ave.

PHILADELPHIA, PENNSYLVANIA

2150-X

Sixty Years Experience as Engineers-Founders-Machinists

LYCURGUS, the great lawgiver of the Spartans, was about the first man on record who ever made a conscientious effort to counteract the ancient truth that money is a root of evil.

He made his money of cumbersome cast iron so that it was difficult to steal, hoard or transport and of course was perfectly useless to foreign traders.

And so the modern belt user who buys untried belt will probably find his money about as productive as the ancient Spartan coins. There is a right belt for every drive.

Spartan Leather Belting

meets the situation on difficult drives where moisture and other adverse conditions prevail.

SPARTAN

The Graton & Knight Mfg. Co.

OAK LEATHER TANNERS, MAKERS OF LEATHER BELTING AND OTHER LEATHER SPECIALTIES

Worcester, Mass., U. S. A.

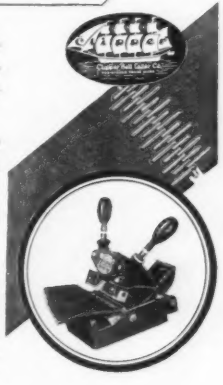
The Mechanical accuracy of Clipper Belt lacing assures a flawlessly laced belt—

The World Over!

In every civilized country, wherever transmission belting is used, Clipper Belt Lacers are quickly and accurately lacing all styles of belts.

The long and short legs of Clipper Hooks, carded alternately on each side, penetrate the tough leather, without weakening the belting fiber, and making a dependable, true running, lasting joint.

These qualifications, and the ease with which a Clipper lacing is applied, have established Clipper Belt Lacers as the standard lacing equipment—the world over.



Clipper Belt Lacer Company

Grand Rapids, Mich.

Anyone can lace a belt with the

Clipper

CLIPPER BELT LACER CO.
GRAND RAPIDS, MICH.

☐ Please send Clipper Belt Lacer on 30 days trial.

☐ Please have salesman call and demonstrate Clipper Belt Lacer.

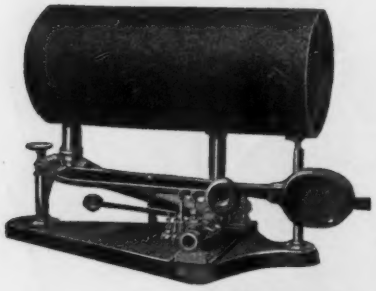
☐ Please send full information regarding Clipper Belt Lacer.

Name _____

Address _____

_____

Proper Drainage Will Keep Your Equipment Piping Hot



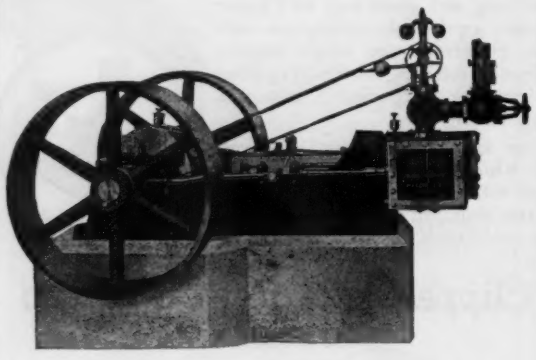
Steam cannot circulate freely through machines which are clogged with condensation. Heat cannot penetrate rapidly through moist heating surfaces. Both of these conditions can be remedied by a Morehead Back-to-Boiler System.

Drain your slashers, dryers, presses or heating system with a Morehead System and they will be piping hot every minute. Production will rise, costs will drop and fuel bills will be materially cut.

Morehead Systems not only drain such equipment constantly, but returns the condensation to the boilers as feed water, without pumps, at temperatures as high as 360 degrees. Write and learn what we are doing for others and can do for *you* in the way of bigger production or lower costs.

MOREHEAD MFG. COMPANY
DEPT. C, DETROIT, MICHIGAN (116)

Morehead
"BACK-TO-BOILER-SYSTEM"
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

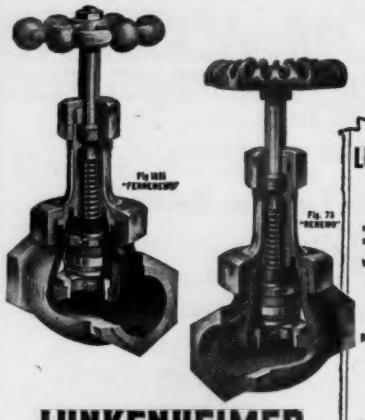


J. S. Schofield's Sons Co.
Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.

Heavy Castings and Wrought Iron Works.



LUNKENHEIMER
"Ferrenewo" and "Renewo" Valves

The "Ferrenewo" for the lower pressure and temperature lines and the "Renewo" for the higher, form a combination which offers manifold advantages and warrant standardization throughout any plant.

They differ only in that the body of the "Ferrenewo" is of Iron and that of the "Renewo" of Bronze. In both Valves the seating surfaces are regrindable, all parts including the nickel seat and disc are renewable, the materials have great wear resisting qualities and offer a large factor of safety, and all other features necessary for the maximum economy of maintenance, service and durability are common to both Valves.

Detailed information is given in Booklets 535 – 567. Write for copies.

"America's Best since 1862"

THE LUNKENHEIMER CO. CINCINNATI, U.S.A.

LUNKENHEIMER PRODUCTS

A comprehensive line of Engineering Appliances offering a type and size to meet all prevailing conditions.

VALVES
Bronze, Iron, Steel; Globe, Angle, Cross, Check, Gate, Throttle, Non-return, Blow-off, Pop Safety, Relief, Whistle, etc.

BOILER MOUNTINGS
Non-return, Pop Safety and Blow-off Valves; Water Columns, Water Gauges and Gauge Cocks, Injectors, Low Water Alarms, Fusible Plugs.

LUBRICATORS
For Steam, Gas, Gasoline Oil, Compressor and Pump Cylinders; Gravity Feed or Hydrostatically, Hand or Mechanically Operated.

OIL AND GREASE CUPS
Glass or Bronze Body Oil Cups with or without Sight-feed; Automatic Feed, Cap or Plunger Screw Feed Grease Cups of Bronze, Iron or Steel.

Whistles, Cocks, Pipe Fittings, Unions, Ejectors, Air Hoists, Automotive Accessories, Etc.

102-28-10

CYCLONE HOISTS
HIGH SPEED

—make elephantine lifts easy!

An elephant weighs about 5 tons. A pull of 109 pounds on the hand chain of a Cyclone Hoist will lift *6 tons.*

This unique illustration of the easy lifting power of a Cyclone Hoist is presented to graphically drive home the unlimited possibilities of the hand chain hoist.

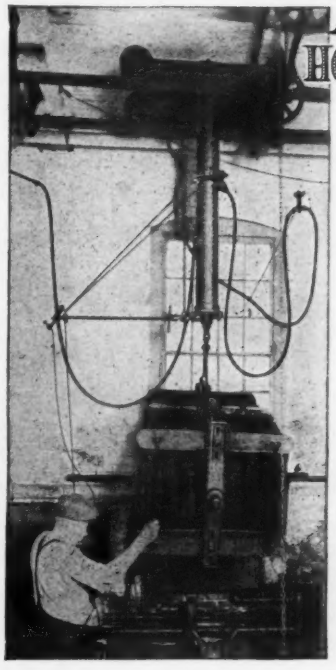
While it is improbable that you have ever thought of lifting an elephant it *is* quite possible that you have many "white elephant lifts" on your hands about your plant,—places where a simple-operating, quick-acting Cyclone can replace time-taking hand labor, or cut delays caused by waiting for travelling crane service.

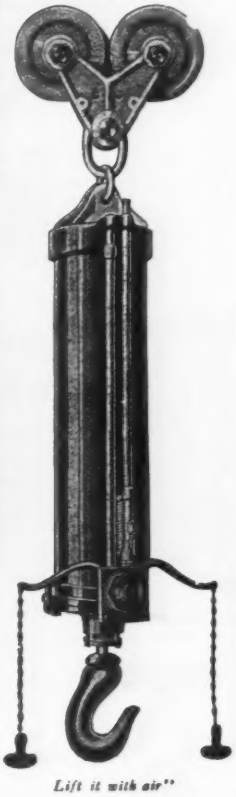
Distributors Everywhere.

Send for catalog covering 1 to 40 Ton Hoists, Cranes, Trolleys, and Overhead Track Systems.

The Chisholm-Moore Mfg. Co.
Cleveland, O.
Hoists Cranes Trolleys
Overhead Track Systems
Branches: **New York, Chicago, Pittsburgh**

CURTIS
AIR HOISTS





Lift it with air"

Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

Curtis Pneumatic Machinery Co.
1571 Kienlin Ave. St. Louis, Mo.
Branch Office
532-R Hudson Terminal New York

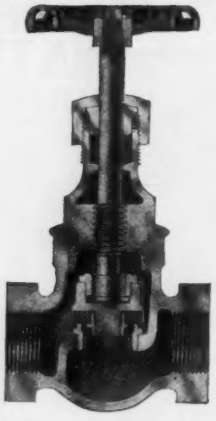
CURTIS
AIR COMPRESSORS-HOISTS-TROLLEYS-CRANES
ST. LOUIS
© C.P.M.Co.

Established 1854

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros



Sectional View Fig 128, Extra Heavy Bronze Globe Valve.

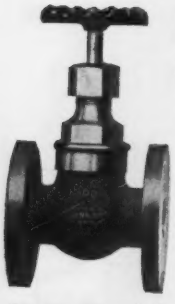


Fig. 129, Flanged, Extra Heavy Bronze Globe Valve.

Powerful Valves
for high pressure service

These valves are carefully designed and properly proportioned for high-pressure service. They feature the best and most approved construction necessary to meet the requirements of up-to-date practice.

Fig. 130, Screwed, Extra Heavy Bronze Angle Valve.

The thick spindles are made of manganese bronze for extra strength, and have powerful threads. Seat rings are removable, and can be reground or renewed when necesary. Valves are supplied with Jenkins composition discs for water or air; with steam metal discs for steam service, or with Monel metal discs and seat rings for superheated steam. All discs are renewable.

As in all Jenkins products, no effort has been spared to make these valves absolutely correct to do the work for which they are built.

Fig. 260, Screwed Extra Heavy Bronze Swing Check Valve.

For assured valve performance and service, for economy—use Jenkins throughout.

Valves in bronze, iron and steel for all requirements

JENKINS BROS.

New York Montreal Boston Philadelphia Chicago London

Always marked with the "Diamond"

Jenkins Valves

SINCE 1864

BOILERS

of the

Water Tube and Tubular Types

OUR SPECIALTY

WALSH & WEIDNER BOILERS with our improved Steel Casing make the ideal Steam Plant. The cost of installation is moderate, the plant looks neat, cost of repairs is slight and they will save from 10 to 25% of your fuel bill.

We also manufacture Tanks of all description, Towers and Tanks, Steel Stacks, Steel Breeching, Smokestacks, Structural Steel and Plate Steel Work.

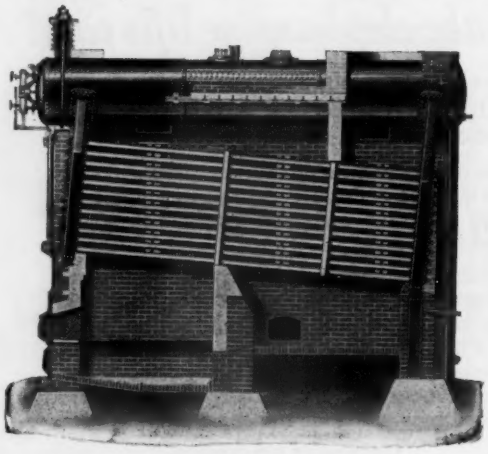
Write for our new catalog.

The Walsh & Weidner Boiler Co.

CHATTANOOGA, TENN.

New York Chicago San Francisco Memphis Havana
Kansas City Jacksonville New Orleans

WATER TUBE BOILERS



HORIZONTAL WATER TUBE BOILERS
VERTICAL WATER TUBE BOILERS
TUBULAR AND MARINE BOILERS
STEEL CASINGS, SMOKE STACKS

THE CASEY-HEDGES CO.

CHATTANOOGA, TENN.

Quick Shipment Our Specialty. Send for Catalogs.

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

The Ultimate Yarn

Product of

Gray Manufacturing Co.

The trade mark "Gray Manufacturing Company" on cotton yarn is an assurance of super quality.

We solicit inquiries from knitters, weavers, lace and thread manufacturers, using 50s to 80s single and ply white combed peeler yarns.

Quotations and samples promptly submitted

H. A. FLORSHEIM, *General Sales Mgr.*
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Works, 2046-48 Amber Street,
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Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

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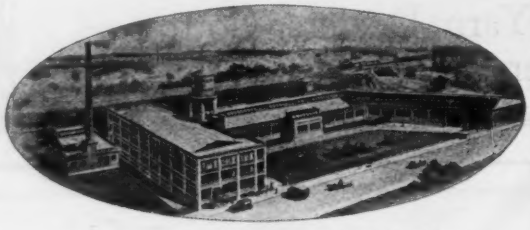
IMPORTER AND COMMISSION MERCHANT

LINEN YARNS
For Weaving, Knitting and all Purposes.

TURKEY RED YARNS
For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine
And Every Description of Linen Thread and Twine

115 Franklin Street, : NEW YORK



View of our Mercerizing and Bleaching Plant

BOGER & CRAWFORD

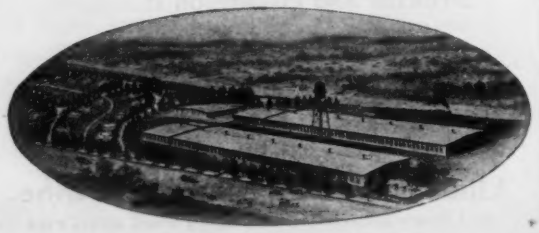
Established 1908

Spinners, Bleachers, Dyers and Mercerizers of High Grade Combed Yarns

By using our Spinning and Mercerizing you are always assured of a standard product.

"From the Cotton Field Direct to You"

Main Office, Factory and Warehouse
J and East Venango Sts., PHILADELPHIA



Spinning Mills, Lincolnton, N. C.

$2.50 Per Day

and upward

is one reason for the rapidly growing popularity of the Hotel Martinique.

Another is the consistent economy of the entire establishment. Here you may enjoy a Club Breakfast at 45c., consisting of Fruit or Cereal, Bacon and Egg, and Rolls and Coffee —Special Luncheon and Dinners of superior quality are also served at the most moderate possible prices.

No location can be possibly more convenient than that of the Martinique. One block from the Pennsylvania Station (via enclosed subway)—Nine blocks from Grand Central—one block from the greatest and best Shops of the City—half a dozen blocks from the Opera and the leading Theatres —and directly connected with the Subway to any part of the City you wish to reach.

"The BEST without extravagance"

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Affiliated with Hotel McAlpin

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COTTON YARNS

of all descriptions for weaving and knitting.

We solicit accounts.

Wire or write us any offerings.

F. W. LAFRENTZ & COMPANY

announce that they

will handle all Auditing, Accounting, Systematizing and Tax Work heretofore done by them under the name of The American Audit Company.

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Successors to A. D. SALKELD & BRO., Inc.
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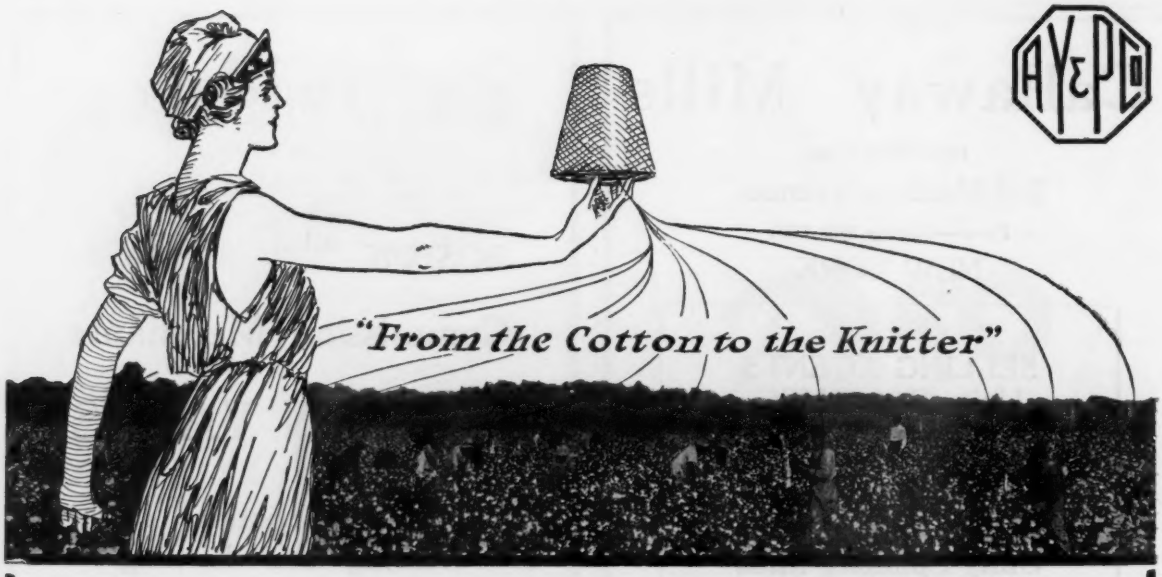
P.O. BOX 854 OLDEST STENCIL AND STAMP HOUSE IN GEORGIA ATLANTA, GA.



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AMERICAN YARN & PROCESSING CO.

MOUNT HOLLY, N. C.

SPINNERS AND MERCERIZERS

HIGH GRADE COMBED AND CARDED YARNS—16s to 80s

Our Mercerized Yarns Are the Product of Our Own Mills

General Office, Mt. Holly, N. C.

Representatives

H. B. ROBIE, 346 Broadway, New York City **FORREST BROS., Forrest Bldg., Philadelphia**

EUROPEAN PLAN

Rooms 600 Baths

Headquarters in Detroit for

OLD COLONY CLUB
DETROIT AUTOMOBILE CLUB

. . . DAILY RATES . . .

$2.50 up single
$5.00 up double
Two Floors of Agents' Sample Rooms—$5.00 per Day

Table d'Hote Dinner, $1.25
Business Men's Lunch, 65c

HOTEL TULLER

CAFETERIA O. C. FROMAN, Mgr. GRILLE

PRINTING

WE do it for some of the largest mills in the South—*Why not for yours?*

If our prices and service were not right, we could not do it.

THE A. J. SHOWALTER COMPANY

Dalton, Georgia.

THE MADISON SQUARE HOTEL

37 Madison Ave., at 26th St.

New York City

Facing Madison Square Park—The Heart of the Cotton Trade

"Live and eat in the same place"

Rooms (European Plan)		Meals	
Single	$2.50 up	Club Breakfast	60c and 75c
Double	$3.50 up	Luncheon	75c
Parlor, Bedroom and Bath	$5.00 up	Home Cooked Dinner	$1.25

A la carte service also.

A New York Home for Southerners

Write for Guide Map of New York. **Management—E. Russell Carlile**

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"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

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(*When replies are to be received in our care, allow four words for box address,*)

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BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.,

Philadelphia, - Pennsylvania

WANTED

MAN TO TRAVEL THE SOUTH REPRESENTING COTTON MACHINERY FIRM.

Address Box 96, care of COTTON, Grant Building, Atlanta, Georgia

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Oxweld Acetylene Co.

ACETYLENE WELDING APPARATUS.
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ACCOUNTANTS.
Ernst & Ernst.
La Frents & Co., F. W.

ACCOUNTING SYSTEMS.
Ernst & Ernst.

ADDING MACHINES.
Monroe Calc. Mch. Co.

AERATING AND CLEANING MACHINE.
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American Blower Co.
Buckeye Blower Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

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Macomb Machine Co.

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Lockwood, Greene & Co.
Robert & Co.
Sirrine, J. E.

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ARTWORK.
Jacobs & Co.

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AUDITORS AND ACCOUNTANTS.
Ernst & Ernst.
La Frents & Co., F. W.

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Philadelphia Drying Mchy. Co.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Whitin Mch. Works.

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AUTOMOBILES.
White Co.

AWNINGS.
Smith Mfg. Co.

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BAGS (COTTON PICKER).
Smith Mfg. Co.

BAGS (COIN OR MONEY).
Smith Mfg. Co.

BAGS (COAL).
Smith Mfg. Co.

BAROMETERS.
Taylor Instrument Co.

BALL BEARINGS.
Aldrich Mch. Works.
Dodge Mfg. Co.
Fulton Supply Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

BALL BEARING HOUSINGS.
Aldrich Machine Works.
Fafnir Bearing Co.
Fulton Supply Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

BALE BAND BUCKLES.
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BALE OPENERS.
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BALING MACHINES.
Crompton & Knowles Loom Wks.
Draper Corporation.
Economy Baler Co.
Logemann Bros.
Rex Eng'g Corp.
Saco-Lowell Shops.

BALING PRESSES.
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BANDAGES, TAPES, ETC.
American Textile Banding Co.
Weimar Bros.

BANDAGE & TAPE MACHINES.
Foster Machine Co.
Whitin Mch. Wks.

BANDS.
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(See Boxes—Mill.)

BATH CABINET—SHOWER.
Crane Co.
Sanymetal Products Co.

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BEAMS.
Mossberg Pressed Steel Corp.
U S Bobbin & Shuttle Co.

BEAM DYEING MACHINES.
Cocker Mch. & Fdry. Co.

BEAM HEADS.
Jordan Mfg. Co.
Mossberg Pressed Steel Corp.
U. S. Bobbin & Shuttle Co.

BEAMING AND WARPING MACHINERY.
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BEARINGS.
Aldrich Machine Works.
Cresson-Morris Co.
Dodge Mfg. Co.
Fulton Supply Co.
Fafnir Bearing Co.
Hyatt Roller Bearing Co.
Renold, Inc., Hans.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.

BELTING (LEATHER, CANVAS AND RUBBER).
American Supply Co.
Bond Co., Chas.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

BELTING—CHAIN.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Morse Chain Co.
Renold, Inc., Hans.

BELTING (ROUND—LEATHER).
Bond Co., Chas.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.

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BELT CONVEYORS.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Morse Chain Co.

BELT DRESSING.
Bond Co., Chas.
Dixon Crucible Co., Jos.
Fulton Bag & Cotton Mills.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.
Williams & Sons, I. B.

BELT FASTENERS.
Bristol Co.
Clipper Belt Lacer Co.
Detroit Belt Lacer Co.
Fulton Supply Co.

BELT LACING (LEATHER).
Bond Co., Chas.
Dodge Mfg. Co.
Fulton Supply Co.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. B.
Williams & Sons, I. B.

BELT TIGHTENERS.
Dodge Mfg. Co.
Fulton Supply Co.
Link-Belt Company.
Rhoads & Sons, J. E.
Wood's Sons Co., T. B.

BELT TIGHTENER DEVICE FOR CONE PICKERS.
Bahan Textile Mch. Co.

BENCH DRAWERS.
Lupton's Sons Co., David.

BENCH LEGS (PRESSED STEEL).
Lupton's Sons Co., David.

BENCHES (PARK AND PLAYGROUND).
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BINS (METAL).
Mills Co.

BLEACHERIES.
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BLEACHING KIERS.
Butterworth & Sons Co., H. W.
Cocker Mch. & Fdry. Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Machry. Co.
Woolford Wood Tank Co., G.

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BLOWERS AND BLOWER SYSTEMS.
American Blower Co.
Buckeye Blower Co.
Carrier Eng. Corp.
General Electric Co.
Philadelphia Drying Mchry. Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

BLOWPIPES (BRAZING, CUTTING, WELDING).
Oxweld Acetylene Co.

BOARDS—FIBRE.
Standard Fibre Co.

BOARDS—FORM.
Pearson, Jos. T.

BOBBINS.
Draper Corporation.
Fulton Supply Co.
Jordan Mfg. Co.
Lestershire Spool & Bobbin Co.
Parker Co., Walter L.
Vermont Spool & Bobbin Co.
U S Bobbin & Shuttle Co.
Whitin Machine Works.

BOBBIN HEADS.
Jordan Mfg. Co.
U S Bobbin & Shuttle Co.
Vermont Spool & Bobbin Co.

BOBBIN STRIPPERS.
Crompton & Knowles Loom Works.
Terrell Machine Co.

BOILERS.
Casey-Hedges Co.
Cole Mfg. Co., R. D.
International Engineering Wks., Inc.
Lombard Iron Works & Supply Co.
Old Hickory Powder Plant.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

BOILER COMPOUNDS.
Dixon Crucible Co., Jos.

BOILER FEED WATER PURIFICATION.
American Water Softener Co.
Casey-Hedges Co.
Norwood Engineering Co.
Scaife & Sons, Wm. B.

BOILER ROOM FITTINGS AND SUPPLIES.
American Blower Co.
Bristol Co.
Casey-Hedges Co.
Crane Co.
Dixon Crucible Co., Jos.
Fulton Supply Co.
Godfrey Conveyor Co.
International Engineering Co.
Jenkins Bros.
Lunkenheimer Co.
Old Hickory Powder Plant.
Sturtevant Co., B. F.

BOILER GRATES AND STOKERS.
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Monroe Calc. Mch. Co.

BOX STRAPPING AND TIE BUCKLES.
(See Banding Straps and Buckles.)

BOXES—MILL.
Lewis Co., G. B.
Smith Mfg. Co.
Standard Fibre Co.

BOXES—PACKING.
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National Paving Brick Mfg. Asso.

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(See Cotton Dealers & Brokers.)

BROKERS—STOCK.
(See Stocks and Bonds.)

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BROOMS—REFILLABLE.
Re-Fil-It Broom Mfg. Co.

BRUSHES—MILL.
Atlanta Brush Co.
Mason Brush Wks.
Re-Fil-It Broom Mfg. Co.
Southwestern Broom Mfg. Co.

BRUSHES—MOTOR AND GENERATOR (COMMUTATOR).
Dixon Crucible Co., Jos.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

BUCKETS AND PAILS—MILL.
Standard Fibre Co.

BUCKETS—ELEVATOR AND GRAB.
Link-Belt Company.

BUCKLES—COTTON TIE.
(See Box Strapping and Ties.)

BUILDING CONTRACTORS.
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BUILDINGS (PORTABLE STEEL).
Dowman, George.
Dowman-Dozier Mfg. Co.

BUILDINGS (READY BUILT).
Minter Homes Co.

BUILDINGS (ALL STEEL).
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Truscon Steel Co.
Maryland Metal Building Co.

BUILDING MATERIAL.
Anchor Post Iron Works.
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Birmingham Slag Co.
Bogart & Carlough Co.
Callahan Co., T. J.
Cooledge & Sons, F. J.
Detroit Graphite Co.
DeVilbiss Mfg. Co.
Dowman-Dozier Mfg. Co.
Dowman, George.
Dufur & Co.
Knapp Fence Co.
Lupton's Sons Co., David.
Maryland Metal Building Co.
Minter Homes Co.
Murphy's Sons, C. P.
National Paving Brick Mfg. Asso.
Richardson Co.
Sanymetal Products Co.
Sonneborn Sons, Inc., L.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.
St. Louis Surfacer & Paint Co.
Truscon Steel Co.
Variety Fire Door Co.
Wagner Mfg. Co.
Walker Electric & Plb. Co.
Ware Paint Co.

BURR PICKERS.
Proctor & Schwartz, Inc.
Sargent's Sons, C. G.

BUSHINGS.
Southern Spindle & Flyer Co.

BUSINESS METHODS.
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CALCULATING MACHINES.
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Butterworth & Sons Co., H. W.
Textile Finishing Mchry. Co

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CALLING SYSTEM—INTER-TELEPHONE.
Carter Electric Co.

CAMPING EQUIPMENT, FURNITURE, STOVES, LIGHTS ETC.
Smith Mfg. Co.

CANNING OUTFIT.
Home Canner Co.

CANS—ROVING.
Standard Fibre Co.

CANS (DRYING).
(See Drying Equipment.)

CARS AND TRUCKS—FIBRE.
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CARDS (BUSINESS OR CALLING—ENGRAVED).
Modern Card Co.
Wiggins Co., John B.

CARBON BURNING APPARATUS.
Oxweld Acetylene Co.

CARBON RODS AND PASTE (WELDING).
Oxweld Acetylene Co.

CARBONIZING MACHINERY.
Klauder-Weldon Dyeing Machine Co.
Macomb Machine Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons & Co., C. G.
Textile Finishing Mchry Co.
Tolhurst Mch. Works.

CARDING MACHINERY AND SUPPLIES.
Howard & Bullough.
Proctor & Schwartz, Inc.
Roy & Son, B. S.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

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Centre Bands—Hard Maple.

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By
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Plain or Steel Clad
Boxes—Baskets
and
Barrels

Gill Boxes
Oval Cans

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Steel Angles—New type continuous angle construction.

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PARK A. DALLIS
ARCHITECT AND ENGINEER
6 WEST HARRIS STREET ATLANTA, GEORGIA

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Proctor & Schwartz, Inc.
Schofield Co., Wm.
Whitin Machine Co.

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Proctor & Schwartz, Inc.
Roy & Son, B. S.
Whitin Machine Works.

CARPET MACHINERY.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Schofield, Wm., Co.
Textile Finishing Mchry Co.

CARRIER APRONS.
(See Aprons.)

CARRIER SYSTEM.
Euclid Crane & Hoist Co.
Curtis Pneumatic Machry. Co.
Wagner Mfg. Co.

CASES—WOODEN.
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CASTINGS.
Briggs, Schaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

CAUSTIC SODA.
(See Bleaching Materials.)

CEMENT REINFORCEMENT.
Birmingham Slag Co.
Truscon Steel Co.

CEMENT AND BRICK COATING.
American Cement Paint Co.
Detroit Graphite Co.
Cooledge & Sons, F. J.
Dixon Crucible Co., Jos.
St. Louis Surfacer & Paint Co.
Hockaday Co.
Sonneborn Sons, Inc., L.
Wadsworth, Howland & Co., Inc.
Ware Paint Co.

CENTRAL STATION (ELECTRIC).
Alabama Power Co.
Georgia Railway & Power Co.
Tennessee Electric Power Co.

CENTRIFUGALS.
Cresson-Morris Co.
Fletcher Works.
Goulds Mfg. Co.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

CHAIN DRIVES.
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CHAIN—BLOCK, BICYCLE, AUTO, ENGINE, AGRICULTURAL, ETC.
Fulton Supply Co.
Link Belt Co.
Morse Chain Co.
Renold, Inc., Hans.

CHAIRS AND STOOLS.
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CHECK STRAPS.
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Fulton Supply Co.
Hayes Loom Reed & Harness Co.
Jacobs Mfg. Co., E. H.

CHEMICALS.
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CHLORINE GAS.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.

CLEANING AND AERATING MACHINE FOR COTTON.
Murray Company, The.

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CLOCKS (TIME).
Root Co.

CLOCKS—WATCHMAN.
Foxboro Co., Inc.
Root Co.

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Firsching, J. A.
Foster Machine Co.
Wildman Mfg. Co.

CLOTH ROOM MACHINERY.
Butterworth, H. W., & Sons Co.
Firsching, J. A.
Foster Machine Co.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
Williams Co., J. H.
Wildman Mfg. Co.

CLOTH SHRINKING MACHINERY.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
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Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Fulton Supply Co.
Link-Belt Company.

CLUTCH LININGS.
Carlyle-Johnson Mch. Co.

COAL AND ASH HANDLING MACHINERY.
Godfrey Conveyor Co.
Link-Belt Company.

COAL TAR DISINFECTANTS.
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COMBERS AND COMBER SUPPLIES.
Foster Machine Co.
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Allis-Chalmers Mfg. Co.
Curtis Pneumatic Mchry Co.
Fulton Supply Co.
General Electric Co.
Goulds Mfg. Co.

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Birmingham Slag Co.

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Foster Mch. Co.
Southern Novelty Co.

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Westinghouse Elec. & Mfg. Co.

CONSULTANTS (BUSINESS METHODS).
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Dowman, George.
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Sirrine & Co., J. E.
Truscon Steel Co.

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CONTRACTORS (HEATING & PLUMBING).
Walker Electric & Plb. Co.

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Williams, C. L.

CONTRACTORS (ROOFING).
Dowman, Geo.
Dowman Dozier Mfg. Co.
Murphy's Sons, C. P.

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Bristol Co.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

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American Supply Co.
Chisholm-Moore Mfg. Co.
Cresson-Morris Co.
Curtis Pneumatic Mchry. Co.
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Euclid Crane & Hoist Co.
Fulton Supply Co.
Godfrey Conveyor Co.
Link-Belt Co.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
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Wagner Mfg. Co.

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Sturtevant Co., B. F.

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COTTON CLEANING AND AERATING MACHINE.
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COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
Aberfoyle Mfg. Co.
Boger & Crawford.
Callaway Mills.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Jamieson, J. B.
Lane & Co., J. H.
Weimar Bros.
Woodward, Baldwin & Co.

COTTON MERCHANTS AND BROKERS
Beer & Co., H. & B.

COTTON MILL MACHINERY AND SUPPLIES.
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Atlanta Harness & Reed Mfg. Co.
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Bahan Textile Mch. Co.
Barber-Colman Co.
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Crompton & Knowles Loom Works.
Draper Corporation.
Dowman, George.
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Eclipse Textile Devices, Inc.
Firsching Co., J. A.
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Foster Machine Co.
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Fulton Supply Co.
Greist Mfg. Co.
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Foxboro Co.
Root Co.

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Jacobs & Co.

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CUTTERS—THREAD.
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DECARBONIZING APPARATUS
Oxweld Acetylene Co.

CUTTING APPARATUS (OXY-ACETYLENE & OXY HYDROGEN).
Oxweld Acetylene Co.
Standard Gas Products Co.

DEHUMIDIFIERS.
American Moistening Co.
Sturtevant Co., B. F.

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Hickory Handle & Mfg. Co.

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Mills Co.
Lupton's Sons Co., David.
Variety Fire Door Co.

DRAWINGS AND ARTWORK.
Jacobs & Co.

DRAWING FRAMES.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

DRESSING ROOMS (METAL PARTITION).
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(See Electric Machinery.)

DRINKING FOUNTAINS.
(See Fountains—Drinking.)

DROP WIRES.
Draper Corp.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
Williams Co., J. H.

DRYING APPARATUS.
American Blower Co.
Buckeye Blower Co.
Dryer Corp. of America.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sturtevant Co., B. F.

DRYING FORMS—HOSIERY.
Pearson, Jos. T.

DRYING MACHINERY AND EQUIPMENT.
American Blower Co.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Cocker Mch. & Fdry. Co.
Dryer Corp. of America.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Sturtevant Co., B. F.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

DUSTING MACHINERY.
Proctor & Schwartz, Inc.
Schofield Co., Wm.

DYERS, BLEACHERS AND FINISHERS.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.

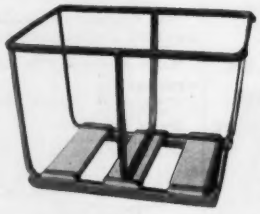
DYEING, BLEACHING, FINISHING AND PRINTING MACHINERY AND EQUIPMENT.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Fdry. Co.
Cole Mfg. Co., R. D.
Dryer Corp. of America.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Macomb Machine Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.
Woolford Wood Tank Co., G.

DYEING MACHINES (PACKAGE AND SPOOL).
Franklin Process Co.

DYE BAGS OR NETS.
Smith Mfg. Co.

DYE STICKS.
Phila. Drying Machinery Co.

DYE VATS AND TUBS.
(See Tanks or Bleaching Kiers.)



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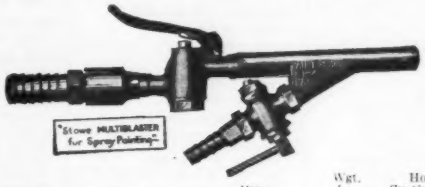

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Borne, Scrymser Co.
Bosson & Lane.
Central Dyestuff & Chemical Co.
Ciba Co., Inc.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
Kali Mfg. Co.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
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Quaker City Chemical Co.
Roessler & Hasslacher Chemical Co.
New Brunswick Chemical Co.
Pennick & Ford, Ltd.
Rohm & Haas Co.
Sandos Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

ELECTRIC CONDUIT AND FITTINGS.
(See Electrical Machinery and Supplies.)

ELECTRIC DYNAMOS AND MOTORS.
(See Motors and Generators.)

ELECTRIC FANS.
(See Fans—Electric.)

ELECTRIC LAMPS.
(See Lamps.)

ELECTRIC LAMP GUARDS.
Ivanhoe Regent Works.
Perry-Mann Electric Co.
Southern Elec. Supply Co.

ELECTRICAL ENGINEERS AND CONTRACTORS.
American Industries Eng'g Co.
Curtis Co., The.
Huntington & Guerry, Inc.
Panton, Harrison D.
Perry-Mann Electric Co.
Standard Electric Co.
Walker Elec. & Plbg. Co.

ELECTRIC LIGHTING ENGINEERS.
(See Illuminating Engineers.)

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Allis-Chalmers Mfg. Co.
American Blower Co.
Bristol Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis Co., The.
Cutter Works, George.
Euclid Crane & Hoist Co.
Fulton Supply Co.
General Electric Co.
Ivanhoe-Regent Works.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Elec. Supply Co.
Standard Electric Co.
Sturtevant Co. B. F.
Walker Electric & Plbg. Co.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

ELECTRIC POWER.
(See Power.)

ELECTRIC PRESSES (HIGH-PRESSURE).
Rex Eng'g Corp.

ELECTRIC TRACTORS AND TRUCKS.
(See Tractors and Trucks—Electric.)

ELECTROTYPES.
Jacobs & Co.

ELEVATORS—PORTABLE.
Collins, J. D.
Euclid Crane & Hoist Co.

ELEVATORS.
Link-Belt Company.

ENAMELED IRON AND GLASS FOR TEXTILE MACHRY.
Mitchell-Bissell Co.

ENAMEL—MILL WHITE.
(See Paint.)

ENGINEERS—MILL.
(See Architects.)

ENGINES—OIL, GAS AND GASOLINE.
Allis-Chalmers Mfg. Co.
Fulton Supply Co.

ENGINES (STEAM).
Allis-Chalmers Mfg. Co.
American Blower Co.
Cole Mfg. Co., R. D.
Fulton Supply Co.
Lombard Iron Works & Supply Co.
Schofield's Sons Co., J. S.
Toomey, Frank.

ENGINE ROOM APPLIANCES AND SUPPLIES.
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Casey-Hedges Co.
Crane Co.
Fulton Supply Co.
Jenkins Bros.
Lonkenheimer Co.
Westinghouse Elec. & Mfg. Co.

ENGINEERS (CONSULTANT AND EFFICIENCY).
Ernst & Ernst.

ENGINEERS (TEXTILE AND MECHANICAL CONSULTING).
Panton, Harrison D.

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American Industries Eng'g Co.

ENGRAVING AND CUTS.
Jacobs & Co.

ETCHING—(PRINTING).
Jacobs & Co.

EXHAUSTERS.
(See Blowers.)

EXPORTERS—COTTON.
(See Brokers.)

EXTRACTORS—HYDRO.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

FACTORY DESKS.
Lupton's Sons Co., David.

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(See Industrial Sites.)

FACTORY MANAGEMENT SYSTEMS.
Ernst & Ernst.

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American Blower Co.
Buckeye Blower Co.
Carter Electric Co.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

FANS—CONVEYING, POWER AND EXHAUST.
(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders.)

FELTING MACHINERY.
Proctor & Schwartz, Inc.

FENCE—STEEL AND IRON.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.
Knapp Fence Co.

FENCE POSTS—CREOSOTED PINE.
Southern Wood Preserving Co.

FIBRE PRODUCTS.
Standard Fibre Co.

FILLING—CAP AND WARP.
U S Bobbin & Shuttle Co.

FILTERS—WATER.
American Water Softener Co.
Scaife & Sons Co., Wm. B.

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Lennig & Co., Chas.

FILTER CLOTHS
Smith Mfg. Co.

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(See Dyers, Bleachers and Finishers.)

FINISHING, BLEACHING AND SIZING MATERIALS.
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Bosson & Lane.
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Electro Bleaching Gas Co.
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Kali Mfg. Co.
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Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Roessler & Hasslacher Co.
New Brunswick Chemical Co.
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Staley Mfg. Co., A. E.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

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Bogert & Carlough.
Dowman-Dosler Mfg. Co.
Dowman, George.
Lupton Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.
Variety Fire Door Co.

FIRE HOSE.
(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

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U S Bobbin & Shuttle Co.

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Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

FLOOD LIGHTS—ELECTRIC.
Cooper Hewitt Electric Co.
Cutter Works, George.
Ivanhoe Regent Works.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.

FLOORS (TAR CONCRETE).
Murphy's Sons, C. P.

FLOORING LUMBER.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

FLOORING—WOOD BLOCKS.
Southern Wood Preserving Co.

FLOOR SCRUBBING MACHINE
American Scrubbing Equipment Co.

FLOOR SCRUBBING POWDERS.
(See Scrubbing Powders.)

FLOOR SWEEPS.
(See Brushes.)

FLUTED ROLLS.
Howard & Bullough.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FLUX (WELDING).
Oxweld Acetylene Co.

FLYERS.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

FOUNDERS.
Briggs-Schaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdy. & Mch. Wks.

FOUNTAINS—DRINKING.
Crane Co.
Manufacturing Equip. & Eng'g Co.
Rundle-Spence Mfg. Co.

FRICTION CLUTCHES.
(See Clutches—Friction.)

FUEL ECONOMIZERS.
Sturtevant Co., B. F.

FURNITURE (FOLDING—CAMP)
Smith Mfg. Co.

FURNITURE—MILL.
Manufacturing Equip. & Eng'g Co.
Mills Co.
Sanymetal Products Co.
Smith Mfg. Co.

FUSES—ELECTRIC.
Carter Electric Co.
Fulton Supply Co.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Electric Supply Co.

GARAGES (PORTABLE—METAL).
Dowman, George.
Dowman-Dosler Mfg. Co.
Maryland Metal Bldg. Co.

GARNETT MACHINES.
Proctor & Schwartz, Inc.

GAS ENGINES.
(See Engines—Gas.)

GASOLINE LIGHTING SYSTEMS, LANTERNS, ETC.
Smith Mfg. Co.

GASOLINE CAMP STOVES.
Smith Mfg. Co.

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Bristol Co.
Fulton Supply Co.
Foxboro Co., Inc.
Taylor Instrument Co.

GAUGE—OIL.
Fulton Supply Co.
Lunkenheimer Co.

GAUGES (LIQUID LEVEL).
Foxboro Co., Inc., The.
Taylor Inst. Co.

GAUGES—WATER.
Fulton Supply Co.
Lunkenheimer Co.

GEARS—SILENT.
Dodge Mfg. Co.
Fulton Supply Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.
Renold, Hans.

GEAR CUTTING AND CUTTERS.
Cresson-Morris Co.

GEAR PULLERS.
General Electric Co.

GENERATORS—ELECTRIC.
(See Motors and Generators.)

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Oxweld Acetylene Co.

GOGGLES (WELDING).
Oxweld Acetylene Co.

GLASSWARE AND DISHES.
(See Dishes.)

GOVERNORS—PUMP.
General Electric Co.

GRAPHIC CHARTS.
Ernst & Ernst.

GRAPHITE.
Detroit Graphite Co.
Dixon Crucible Co., Jos.

GRATES—BOILER.
Casey-Hedges Co.
Cole Mfg. Co., R. D.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

GRATES—MECHANICAL.
(See Stokers.)

GREASE.
(See Lubricants.)

GRAVEL AND SLAG ROOFING.
Murphy's Sons, C. P.

GREASE CUPS.
(See Lubricators.)

GRINDER—CARD, CYLINDER, ROLL, NAPPER AND GARNET.
(See Card Grinding Machinery.)

GUAGES (WELDING).
Oxweld Acetylene Co.

GUARDS—ELECTRIC LAMP.
(See Electric Lamp Guards.)

GUARDS — MACHINE, SKYLIGHT, WINDOW, ETC.
Anchor Post Iron Works.
Dowman, George.
Knapp Fence Co.

GUIDES—THREAD.
Mitchell-Bissell Co.
Palmer Co., I. H.

GUMS.
(See Finishing and Sizing Materials.)

HALFTONES—PRINTING.
Jacobs & Co.

HANGERS.
(See Shafting and Hangers.)

HANK CLOCKS.
(See Counters.)

HARDWARE—BUILDING.
Dowman, George.
Dowman-Dosler Mfg. Co.
Sanymetal Products Co.
Wagner Mfg. Co.

HARNESS—LOOM.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Works.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Hayes Loom Reed & Harness Co.

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Lestershire Spool & Bobbin Co.
Parker Co., Walter L.
U S Bobbin & Shuttle Co.

HEATING AND VENTILATING APPARATUS.
(See Ventilating Apparatus.)

HEATING & PLUMBING CONTRACTORS.
Walker Electric & Plbg. Co.

HEDDLES.
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Draper Corporation.
Steel Heddle Mfg. Co.
Williams Co., J. H.

HEDDLE FRAMES.
Crompton & Knowles Loom Works.
Steel Heddle Mfg. Co.
Williams Co., J. H.

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Chisholm Moore Mfg. Co.
Curtis Pneumatic Mchry Co.
Euclid Crane & Hoist Co.
Fulton Supply Co.
Link-Belt Company.
Morse Chain Co.

HOPPER FEEDERS.
(See Automatic Feeders.)

HORNS AND MUSICAL INSTRUMENT.
Cable Piano Co.
Conn, Ltd., C. G.

HOSE (WELDING).
Oxweld Acetylene Co.

HOSIERY DYEING MACHINERY.
Cole Mfg. Co., R. D.
Franklin Process Co.
Philadelphia Drying Mchry. Co.

HOSIERY FORMS.
(See Drying Forms.)

HOSIERY YARNS.
(See Yarn Manufacturers.)

HOTELS.
Hotel Madison Square.
Hotel Martinique.
Hotel Tuller.

HOUSES AND MILL COTTAGES (READY BUILT).
Minter Homes Co.

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American Moistening Co.
Carrier Eng. Corp.
Parks-Cramer Co.
Sturtevant Co., B. F.

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Foxboro Co., Inc., The.
Taylor Instrument Co.

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Foxboro Co., Inc., The.

HYDRODEIKS.
Taylor Instrument Co.

HYGROMETERS.
Foxboro Co.
Taylor Instrument Co.

HYDRAULIC TURBINES.
(See Turbines—Hydraulic.)

HYDRO EXTRACTORS.
(See Extractors.)

ILLUMINATING ENGINEERS.
Cooper Hewitt Electric Co.
Curtis Co., The.
Huntington & Guerry.
Panton, Harrison D.
Ivanhoe-Regent Works.
Walker Elec. & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

INDICATING AND RECORDING INSTRUMENTS AND THERMOMETERS.
Bristol Co.
Foxboro Co., Inc.
General Electric Co.
Root Co.
Taylor Instrument Co.

INDIGO.
(See Dyestuffs and Chemicals.)

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Georgia Ry. & Power Co.
Old Hickory Powder Plant.
Tennessee Electric Power Co.

INJECTORS.
Lunkenheimer Co.

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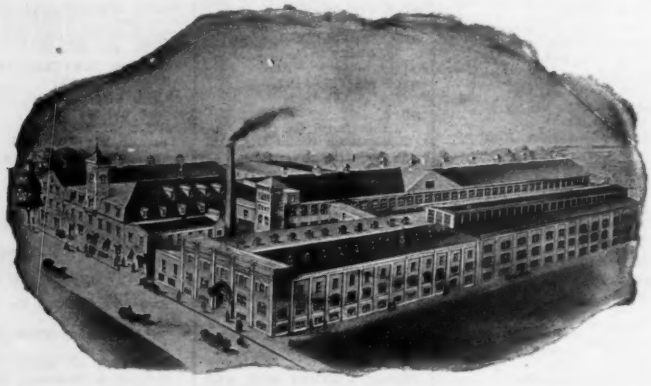
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Travelers Insurance Co.

INSURANCE.
Prudential Insurance Co.

IRON WORK—ORNAMENTAL.
Anchor Post Iron Works.
Cyclone Fence Co.
Dowman, George.
Dufur & Co.



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Knapp Fence Co.
Lombard Iron Works & Supply Co.

JACK SPOOLS.
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JACQUARDS.
Crompton & Knowles Loom Works.

JOINT COMPOUND.
Dixon Crucible Co., Jos.

JUTE BAGGING MACHINE.
Proctor & Schwartz, Inc.

KETTLES—SIZE.
(See Size Kettles.)

KETTLES—SODA.
Lombard Iron Works & Supply Co.

KIERS.
(See Bleaching Kiers.)

KNIT GOODS.
(See Cotton Cloth Commission Merchants and Dealers.)

KNIT GOODS WASHERS.
(See Washers—Cloth.)

KNITTING MACHINERY AND SUPPLIES.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Scott & Williams.
Torrington Co.
Trump Bros. Machine Co.
Wildman Mfg. Co.

KNITTING NEEDLES.
Torrington Co.

KNOTTERS.
Barber-Colman Co.
Mill Devices Co.

LABORATORY INSTRUMENTS.
Bristol Co.
Scott & Co., Henry L.
Foxboro Co., Inc.
Root Co.
Taylor Instrument Co.

LACING—BELT.
(See Belt Lacing.)

LAMPS—INCANDESCENT AND ARC.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis Co., The.
Cutter Works, George.
General Electric Co.
Ivanhoe-Regent Works of G. E. Co.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Electric Supply Co.
Walker Electric & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

LAMP GUARDS—KEY LOCKING.
(See Electric Lamp Guards.)

LAMP REFLECTORS.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis Co., The.
Cutter Works, George.
Ivanhoe-Regent Works of G. E. Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Walker Electric & Plbg. Co.
Westinghouse Elec. & Mfg. Co.

LANDSCAPE ARCHITECTS.
(See Village Architects.)

LAPPERS.
Saco-Lowell Shops.
Whitin Machine Works.

LATHES.
Fulton Supply Co.

LAUNDRY BAGS, BASKETS, & NETS.
Smith Mfg. Co.

LAUNDRY MACHINERY.
American Laundry Mchry. Co.
Fletcher Works.
Hunt Machine Co., Rodney.
Schaum & Uhlinger.
Tolhurst Machine Works.

LAVATORIES.
Crane Co.
Manufacturing Equip. & Eng'g Co.
Vogel Co., Jos. A.

LEAD BURNING APPARATUS (OXY-ACETYLENE AND OXY CITY GAS).
Oxweld Acetylene Co.

LEATHER BELTING.
(See Belting.)

LEATHER SPECIALTIES.
American Supply Co.
Bond Co., Chas.
Graton & Knight Mfg. Co.
Jacobs Mfg. Co., E. H.
Williams & Sons, I. B.

LIGHTS—FLOOD.
(See Flood Lights.)

LIGHTING ENGINEERS AND CONTRACTORS.
(See Illuminating Engineers.)

LINEN YARNS.
(See Yarns Linen.)

LINK BELTING.
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Draper Corporation.
Fletcher Works.
Hopedale Mfg. Co.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

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Hopedale Mfg. Co.

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N. Y. & N. J. Lubricant Co.
Texas Co.

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N. Y. & N. J. Lubricant Co.

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Southern Wood Preserving Co.

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Bradley Mfg. Co., A. J.

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Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

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American Yarn & Pro. Co.
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Dixie Mercerizing Co.
Hunter Mfg. & Comm. Co.

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Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.
Truscon Steel Co.

METAL SIDING.
Dowman, George.
Dowman-Dozier Mfg. Co.

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Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Southwestern Broom Mfg. Co.

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American Blower Co.
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Fulton Supply Co.
General Electric Co.
Perry-Mann Electric Co.
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Dixie Seal & Stamp Co.
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Knapp Fence Co.
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Texas Co.
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Bradley Mfg. Co., A. J.

OIL PUMPS.
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Whitin Machine Works.

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Hockaday Co.
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Sonneborn Sons, Inc., L.
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Dowman-Dozier Mfg. Co.
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PEROXIDES.
Roessler & Hasslacher Chemical Co.

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Jacobs Mfg. Co., E. H.

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Washburn, Inc.

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Fulton Supply Co.

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Southern Wood Preserving Co.

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Fulton Supply Co.
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Hyatt Roller Bearing Co.
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PRESSURE GAUGES.
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Westinghouse Elec. & Mfg. Co.

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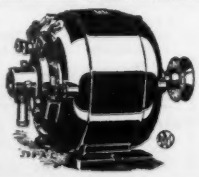

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General Electric Co.

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Oxweld Acetylene Co.

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Whitin Machine Works.

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Dowman-Dozier Mfg. Co.

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Whitin Machine Works.

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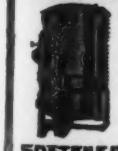

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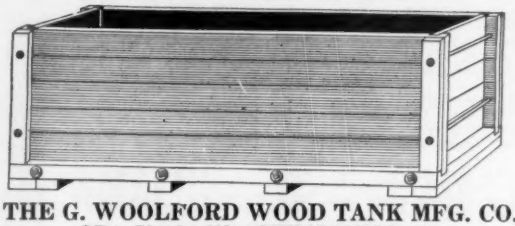

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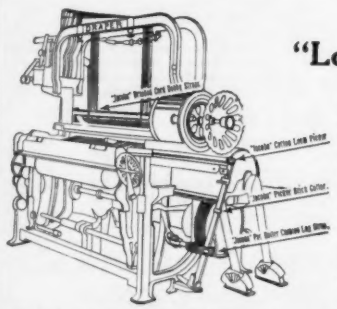

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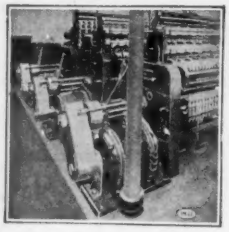

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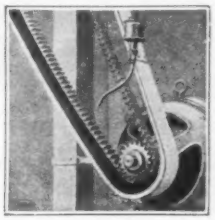

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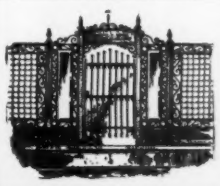

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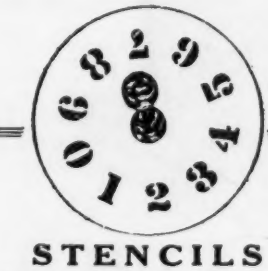
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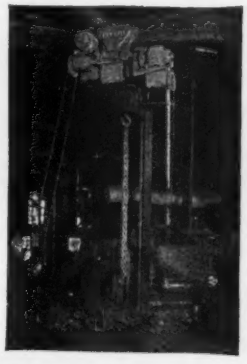
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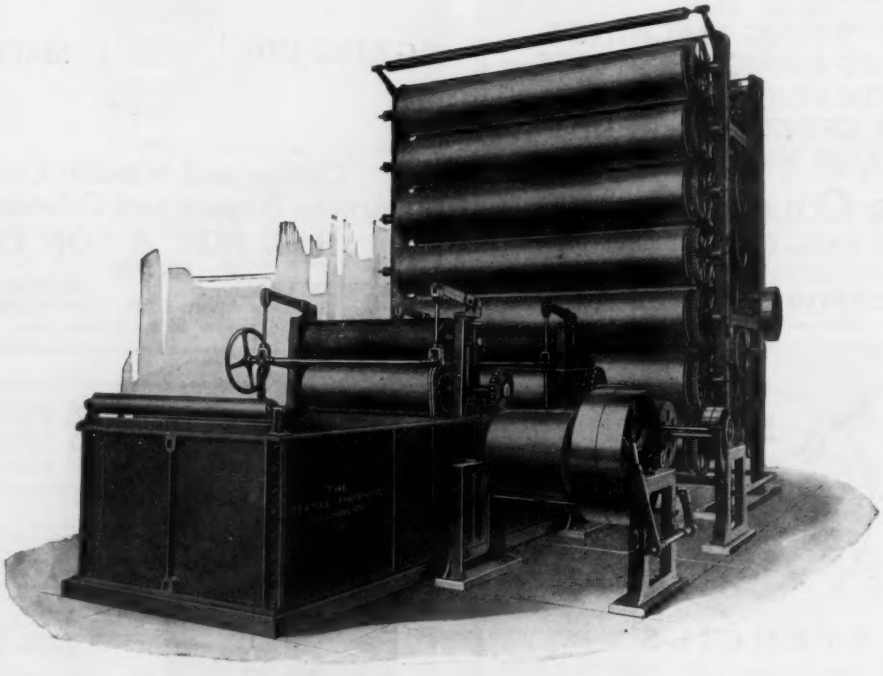

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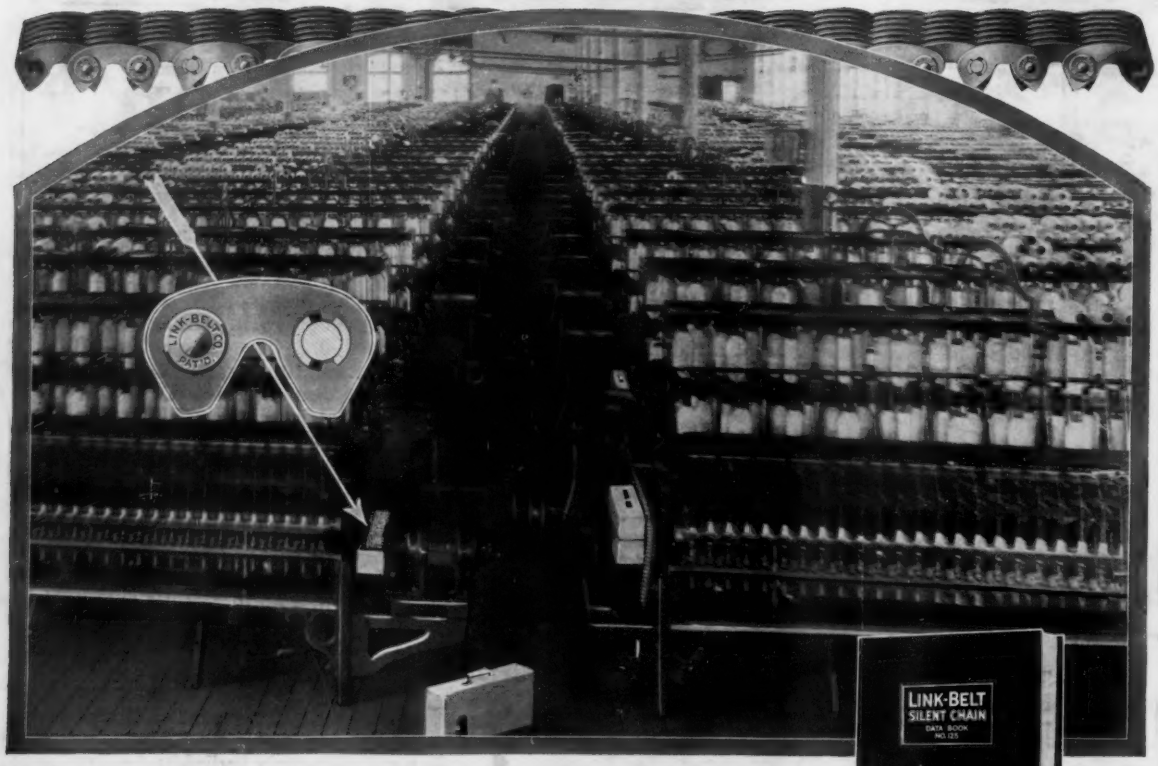

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